



44th NAMRC | MSEC 2016

44th NAMRC
SME North American
Manufacturing
Research Conference

MSEC 2016
Manufacturing Engineering
Division of ASME's 11th
Manufacturing Science and
Engineering Conference

June 27 - July 1, 2016
Blacksburg, Virginia

PROGRAM

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WEBSITE

Looking for more information?
namrc-msec-2016.vt.edu

ABSTRACTS

Abstracts are available online.
Visit: namrc-msec-2016.vt.edu/abstracts for information and access.

QUESTIONS

If you have questions or concerns, visit the Reception Desk located in the Lobby the Virginia Tech Inn.

TIPS

Check the conference app or visit the conference registration table for updates and announcements.

Student volunteers are ready to assist you. You may request their assistance by visiting the conference registration table

How to download the conference app:

1. Download the Event App

Open this link on your mobile device <http://eventapps.quickmobile.mobi/> and select your platform.



2. Find Event

Tap Event ID, enter NAMRCMSEC (case sensitive) and press the Get Event Info button to download.



Monday, June 27, 2016

Time	Event	Location	Facilitator
7:00am - 8:00am	Breakfast (SME Staff and NAMRI BOD)	Old Guard	
8:00am - 4:00pm	NAMRI Board of Directors Meeting	Duck Pond	Steve Schmid
11:00am - 5:00pm	Registration	Lower Quad	
12:00pm - 1:00pm	Lunch (SME staff and NAMRI BOD)	Old Guard	
12:00pm - 6:00pm	Effective Proposal Writing Workshop	Allumni Assembly	Tony Schmitz
1:00pm - 7:00pm	GenEdge Workshop	Drillfield	GenEdge
1:00pm - 3:25pm	BioAdditive Manufacturing Tutorial	Smithfield	Scott Verbridge, Blake Johnson
1:00pm - 4:00pm	Exhibit Set-up	Latham Foyer	
3:35pm - 5:00pm	Technology Transfer	Smithfield	Scott Pearl
5:00pm - 7:00pm	Lab Tours	Goodwin Hall	
7:00pm - 9:00pm	Techworking Reception	Latham Ballroom	

Tuesday, June 28, 2016

Time	Event	Location	Facilitator
7:00am - 7:00pm	Registration	Lower Quad	
7:30am - 5:00pm	Exhibits	Latham Foyer	
8:00am - 8:15am	Welcome	Latham Ballroom	Jaime Camelio
8:15am - 8:35am	Keynote: Mike Molnar, "The National Network for Manufacturing Innovation"	Latham Ballroom	Frank Pfefferkorn
8:35am - 8:45am	Keynote: Prof. Sridhar Kota, ("M-Foresight: The Alliance for Manufacturing Foresight")	Latham Ballroom	Frank Pfefferkorn
8:45am - 9:00am	Remembering David Dornfeld and Ranga Komanduri	Latham Ballroom	Moneer Helu, Shivakumar Raman
9:10am - 12:00pm	MED Executive Committee Meeting	Durham Hall Rm 260	Brian Paul

Conference Schedule

Tuesday, June 28, 2016

Time	Event	Location	Facilitator
9:15am - 10:45am	Manufacturing in a Low Energy Future: Invited Talk by Dr. Julian Allwood (Cambridge University)	Alumni Assembly	Barbara Linke, Moneer Helu
Concurrent Technical Tracks: 1			
	Komanduri Symposium: Opening and NAMRC - 137	Solitude	Shiva Raman, Satish Bukkapatnam
	MSEC Session 4-6-1 Cloud Manufacturing - an Industrial Perspective 1: MSEC papers 8530, 8572, 8581	Cascades A	Xun Xu, Lihui Wang
	NNMI Manufacturing Implementation: NAMRC - 101, 147, 119	Drillfield	John Agapious, Hongliang Wang
	MSEC Session 1-2-1 Cellular Materials: MSEC papers 8849,8767,8837	Draper's Meadow	Sameh Tawfick
9:15am - 10:45am	MSEC Session 4-3-1 Cyber-Physical Systems, Stochastic Modeling, and Sensor Networks: MSEC papers 8660,8661,8663	Cascades B	Dongping Du, Zimo Wang
	MSEC Session 2-14-1 Advances in Composites Manufacturing Processes 1: MSEC papers 8864,8531,8773	Ellett Valley	Daniel Walczyk, David Hauber
	MSEC Session 2-4-1 Solid-State Processing: MSEC papers 8512, 8747, 8770	Duck Pond	Nilesh Kumar
	MSEC Session 2-2-1 Assisted/Augmented Manufacturing Processes 1: MSEC papers 8554, 8555,8736	Huckleberry	Burak Sencer, Abram Pleta
10:45am -11:00am	Morning Break	Upper Foyer	
11:00am - 12:30pm	Student Manufacturing Design Competition 1: MSEC oral presentations 8904, 8905, 8906, 8910	Ellett Valley	Kevin Chou, Radu Pavel
Concurrent Technical Tracks: 2			
11:00am - 12:30pm	Komanduri Symposium: NAMRC -71, 74, 133	Solitude	Shivakumar Raman, James Kong
	NAMRC Joining I: 48, 26, 115	Drillfield	Herman Tang, Hongtao Ding
	Mfg. Education & Workforce Development 1: NAMRC - 57, 104, 142	Smithfield	Gloria Wines, Bryan Chu

Tuesday, June 28, 2016

Time	Event	Location	Facilitator
11:00am - 12:30pm	MSEC Session 5-3-1 Advances in Sustainable Manufacturing Processes: MSEC papers 8748, 8618, 8744	Alumni Assembly	Chandra Nath, Barbara Linke
	MSEC Session 4-6-2 Cloud Manufacturing - an Industrial Perspective 2: MSEC papers 8726, 8658, 8538	Cascades A	Goran Adamson, Lei Ren
	MSEC Session 1-2-2 Electronic Materials: MSEC papers 8627, 8654	Cascades B	Sameh Tawfick, Rebecca Kramer
	MSEC Session 2-14-2 Advanced in Composites Manufacturing Processes 2: MSEC papers 8606, 8607, 8683	Draper's Meadow	Daniel Walczyk, David Hauber
	MSEC Session 2-4-2 Solid-State Joining 2: MSEC papers 8695, 8841, 8599	Huckleberry	Wayne Cai
	MSEC Session 2-2-2 Assisted/Augmented Manufacturing Processes II: MSEC papers 8565, 8605, 8611	Duck Pond	Mohammad Sima, Farbod Akhavan Niaki
12:30pm - 1:50pm	Industry Lunch	Latham Ballroom	
	JSME Editor's Meeting	Old Guard	
2:00pm - 3:30pm	Student Manufacturing Design Competition 2: MSEC oral presentations 8907, 8908, 8909, 8911	Ellett Valley	Kevin Chou, Radu Pavel

Concurrent Technical Tracks: 3

2:00pm - 3:30pm	Komanduri Symposium: NAMRC - 3, 140, 128	Solitude	Ramesh Babu, Shreyes Melkote
	Process, Property, Performance Relationship in Additive Mfg. 1: MSEC - 8561, MSEC -8791, NAMRC- 118	Alumni Assembly	Bashir Khoda, Chi Zhou
	MSEC Session 4-4-1 Data Infrastructures for Mfg. Planning & Control 1: MSEC papers 8666,8783, 8769	Drillfield	Moneer Helu, Parikshit Mehta
	Mfg Education & Workforce Development 2: NAMRC - 138, 139, 155	Smithfield	Hitomi Yamaguchi, Haley Stevens
	MSEC Session 1-2-3 Novel Meta Structures: MSEC papers 8754, 8668, 8755	Duck Pond	Sameh Tawfick, Kenneth Cheung
	NAMRC Forming I: NAMRC - 129, 143 and Abrasive Machining: NAMRC 69	Cascades A	Stefani Bruschi, Gracious Ngaile

Conference Schedule

Tuesday, June 28, 2016

Time	Event	Location	Facilitator
2:00pm - 3:30pm	NAMRC Cutting I - Milling : NAMRC - 8, 29, 33	Cascades B	Raja Kountanya, Xiaoliang Jin
	MSEC Session 2-5-1 Abrasive Machining Overview: MSEC papers 8585, 8876	Draper's Meadow	Barbara Linke, Mark Jackson
	MSEC Session 5-1-1 Sustainable Mfg. Model Definition and Syst. Engineering: MSEC papers - 8702, 8792	Huckleberry	Tom Hedberg, Nathan Hartman
3:30pm - 3:45pm	Afternoon break	Upper Quad	
Concurrent Technical Tracks: 4			
3:45pm - 5:15pm	Komanduri Symposium: NAMRC - 5, 68, 13	Solitude	Satish Bukkaptanam, Prahlad Rao
	Novel Topics in Additive Manufacturing I: NAMRC 127, 35 and MSEC - 8551	Alumni Assembly	Murali Sundaram, Jarred Heigel
	MSEC Session 4-4-2 Data Infrastructures for Mfg. Planning & Control 2: MSEC papers 8751, 8635	Drillfield	Parikshit Mehta, Moneer Helu
	Mfg. Education & Workforce Development 3: Panel Discussion	Smithfield	Hitomi Yamaguchi
	MSEC Session 2-2-3 Assisted/Augmented Manufacturing Processes 3: MSEC papers 8652, 8734, 8810	Duck Pond	Ihab Ragai, Lujia Feng
	NAMRC Cutting II- Turning: NAMRC -19, 23, 49	Cascades B	Patrick Kwon, Shan Luo
	NAMRC Surface I - NAMRC -67, 78, 149	Cascades A	Herman Tang, Steven Schmid
	MSEC Session 2-5-2 Abrasive Machining Machine Design: MSEC papers 8527, 8634, 8709	Draper's Meadow	Barbara Linke , Kai Cheng
	MSEC Session 5-1-2 Sustainable Manufacturing Information Management: MSEC papers 8745, 8677	Huckleberry	Nathan Hartmann, Thomas Hedberg
	MSEC Session 2-1-1 Energy Field Manufacturing Process I: MSEC papers 8515, 8869, 8718	Ellett Valley	Weilong Cong, Alessandro Fortunato
4:00pm - 6:00pm	Industry Reception Setup	Lane Stadium	Briand Paul, Shawn Moylan

Tuesday, June 28, 2016

Time	Event	Location	Facilitator
5:30pm - 6:00pm	ASME MED Membership Meeting	Smithfield	Briand Paul, Shawn Moylan
6:00pm - 6:30pm	NAMRI SME Membership Meeting	Smithfield	Steve Schmid
6:30pm - 7:30pm	Shuttles depart for industry reception every 15 min	1st floor lobby	
7:00pm - 9:00pm	Industry Reception	Lane Stadium	
8:30pm - 9:30pm	Shuttles pick up from industry reception every 15 min		

Wednesday, June 29, 2016

Time	Event	Location	Facilitator
7:00am - 7:00pm	Registration	Lower Quad	
7:30am - 5:00pm	Exhibits	Latham Foyer	
8:00am - 8:05am	Welcome	Latham Ballroom	Jaime Camelio
8:05am - 9:00am	Keynote: Prof. Fritz Klocke, "Smart Technologies for a Sustainable and Resource Efficient Production"	Latham Ballroom	Albert Shih

Concurrent Technical Tracks: 5

	Komanduri Symposium: NAMRC - 76, 123, 15	Smithfield	Terri Jia, Wilfredo Moscoso-Kingsley
	Dornfeld Symposium: Opening Session	Solitude	Moneer Helu
	Process, Property, Performance Relationship in Additive Mfg. 2: MSEC papers 8790, 8846 and NAMRC - 10	Alumni Assembly	Rayne Zheng, Sam Anand
9:15am - 10:45am	MSEC Session 3-1-1 Analysis, Design, and Mfg. of Biomedical Devices 1: MSEC papers 8690, 8696, 8743	Duck Pond	Bruce Tai, Hitomi Yamaguchi
	MSEC Session 4-6-3 Cloud Manufacturing - an Industrial Perspective 3: MSEC papers 8723, 8752, 8771	Drillfield	Xi Vincent Wang, Tao Peng
	NAMRC Cutting III - Milling: NAMRC - 65, 73,39	Cascades A	Patrick Kwon, Shan Luo
	NAMRC Machine Tool I: NAMRC - 21, 81, 105	Cascades B	Prahalad Rao, Seungchul Lee

Conference Schedule

Wednesday, June 29, 2016

Time	Event	Location	Facilitator
9:15am - 10:45am	MSEC Session 1-1-1: Effect of Surface Modification on Corrosion Behavior: MSEC papers 8705, 8689, 8822	Draper's Meadow	Dong Lin, Wilfredo Moscoso, Chang Ye
	MSEC Session 2-5-3 Abrasive Machining Tool Design and Products: MSEC papers 8636, 8613, 8707	Ellett Valley	Kai Cheng
	MSEC Session 2-1-2 Energy Field Manufacturing Process 2: MSEC papers 8544, 8549, 8686	Huckleberry	Xin Zhao, Murali Sundaram
10:45am -11:00am	Morning Break	Upper Foyer	
Concurrent Technical Tracks: 6			
11:00am - 12:30pm	Komanduri Symposium: NAMRC - 56, 120, 153	Smithfield	Jingyan Dong, Shiva Raman
	Dornfeld Symposium 2 - Invited talk by Gerald Byrne and Tool Wear NAMRC 88, 7	Solitude	Elijah Kannatey-Asibu
	Novel Topics in Additive Manufacturing 2: MSEC -8569, and NAMRC - 14, 125	Alumni Assembly	Bruce Tai, Kira Barton
	MSEC Session 3-2-1 Additive Bio-mfg. of Tissues and Multiscale Engineered Tissue Constructs -1: MSEC papers 8556, 8774, 8787	Duck Pond	Binil Starly, Jason Moore
	MSEC Session 4-6-4 Cloud Manufacturing - an Industrial Perspective 4: MSEC papers 8620, 8733, 8669	Drillfield	Lihui Wang, Xun Xu
	NAMRC Cutting IV - Milling: NAMRC - 44, 61 and NAMRC Forming - 11	Cascades A	Wilfredo Moscoso-Kingsley, Stefania Bruschi
	NAMRC Machine Tool II: NAMRC - 60, 83, 92	Cascades B	Prahalad Rao, Seungchul Lee
	MSEC Session 1-1-2 Nanocrystalline Surface Modification: MSEC papers 8701, 8703, 8737	Draper's Meadow	Christopher Saldana, Wilfredo Moscoso, Yang Guo
MSEC Session 2-5-4 Abrasive Machining Brittle Materials: MSEC papers 8622, 8765, 8543	Ellett Valley	Mark Jackson, Robin Bright	

Wednesday, June 29, 2016

Time	Event	Location	Facilitator
11:00am - 12:30pm	MSEC Session 2-1-3 Energy Field Mfg. Processes 3: MSEC papers 8740, 8812, 8814	Huckleberry	Wenda Tran, Alessandro Ascari
12:30pm - 1:10pm	Lunch	Latham Ballroom	
1:15pm - 1:50pm	ASME Awards Luncheon	Latham Ballroom	
Concurrent Technical Tracks: 7			
2:00pm - 3:30pm	Komanduri Symposium: NAMRC - 38, 18, 12	Smithfield	B. Zhang, N. Umehara
	Dornfeld Symposium 3 - Process Monitoring: MSEC papers 8820, 8551, 8725	Solitude	Gerald Byrne, Elijah Kannatey-Asibu
	Novel Topics in Additive Manufacturing 3: NAMRC - 72, 80, 98	Assembly	Bruce Tai, David Hoelzle
	MSEC Session 3-1-2 Analysis, Design, and Manufacturing of Biomedical Devices - 2: MSEC papers- 8513, 8731, 8801	Duck Pond	Jyhwen Wang, Jason Moore
	CPS in Manufacturing: NAMRC - 30, 51, 99	Drillfield	Yuan-Shin Lee, David Culler
	NAMRC Laser Processing I: NAMRC - 20, 89, 108	Cascades A	Benxin Wu, Jia Tao
	NAMRC EDM/ECM I: NAMRC - 4, 66	Cascades B	Wansheng Zhao, Blake Johnson
	MSEC Session 1-1-3 Severe Shear and Plastic Deformation: MSEC papers 8503, 8802, 8609	Draper's Meadow	Wilfredo Moscoso, Yang Guo, Chang Ye
	MSEC Session 2-7-1 Scalable Nanomanufacturing 1: MSEC papers 8584, 8782, 8797	Ellet Valley	Robert Keynton
	MSEC Session 2-1-4 Energy Field Manufacturing Processes 4: MSEC papers 8562, 8859	Huckleberry	Yongxiang Hu, Ninggang Shen
3:00pm - 4:00pm	Poster Session Set up	Latham Ballroom	
3:30pm - 3:45pm	Afternoon Break	Upper Quad	

Wednesday, June 29, 2016

Time	Event	Location	Facilitator
Concurrent Technical Tracks: 8			
3:45pm - 5:15pm	Dornfeld Symposium 4 - Sustainable Mfg. 1: NAMRC - 84, 106, 36	Solitude	Valerie Maier-Speredelozzi
	CAD/CAM Topics in Additive Manufacturing-1: NAMRC - 100, 27 and MSEC - 8784	Alumni Assembly	Bashir Khoda, Jing Shi, Weilong Cong
	MSEC Session 2-3-1 Solid State Joining 1: MSEC papers 8578, 8589, 8823	Smithfield	Jingjing Li and Wayne Cai
	MSEC Session 3-1-3 Analysis, Design, and Manufacturing of Biomedical Devices - 3: MSEC papers- 8794, 8806, 8840	Duck Pond	Yuan-Shin Lee, Ying Zhang
	CPS in Manufacturing: NAMRC - 109, 86, 135	Drillfield	David Culler, Binil Starly
	NAMRC Laser Processing II: NAMRC - 114, 116, 124	Cascades A	Jianfeng Ma, Benxin Wu
	NAMRC EDM/ECM I I: NAMRC - 102, 131, 148	Cascades B	Lin Gu, Jingfu Liu
	MSEC Session 1-1-4 Micromechanics and Microstructure Evolution: MSEC papers 8580, 8594, 8778	Draper's Meadow	Saurabh Basu, Yang Guo, Wilfredo Moscoso
	MSEC Session 2-7-2 Scalable Nanomanufacturing 2: MSEC papers 8566, 8793, 8775	Ellett Valley	Rajiv Malhotra
	MSEC Session 2-1-5 Energy Field Manufacturing Processes 5: MSEC papers 8759, 8772, 8775	Huckleberry	Zengrong Hu, Ross Wilcoxon
	Concurrent Technical Tracks: 9		
5:30pm - 7:00pm	Dornfeld Symposium Tool Wear: NAMRC - 50,70	Solitude	Warren DeVries
	MSEC Session 2-10-1 Processing and Testing of Polymers and Composites 1: MSEC papers 8557, 8678	Drillfield	Loredana Santo, Felicia Stan
	MSEC Session 3-2-2 Additive Bio-mfg. of Tissues & Multiscale Engineered Tissue Constructs 2: MSEC papers 8582, 8588, 8619	Duck Pond	Robert Chang, Eda Yildirim-Ayan
	MSEC 2-11-1 3D printed Smart Polymers: MSEC papers 8667, 8826, 8865	Cascades A	Howon Lee, Keng Hsu

Wednesday, June 29, 2016

Time	Event	Location	Facilitator
5:30pm - 7:00pm	MSEC Session 4-10-1 Quality Assurance in Additive Manufacturing Systems: MSEC papers 8516, 8535, 8815	Cascades B	Prahalad Rao, Chi Zhou
	MSEC Session 2-7-3 Scalable Nanomanufacturing 3: MSEC papers 8662, 8671	Ellett Valley	Michael Cullinan
	MSEC Session 4-1-1 Manufacturing Equipment and Process Control: MSEC papers 8573, 8529, 8762	Huckleberry	Ping Guo and Hontao Ding
	MSEC Session 4-9-1 Analytics for System Information and Sustainability 1: MSEC papers 8506, 8518, 8617	Draper's Meadow	Weihong Gio, Ran Jin, Chenhui Shao
7:00pm - 9:00pm	MSEC Poster Session: MSEC posters 8655, 8711, 8712, 8727, 8742, 8758, 8844, 8882, 8881, 8883, 8884, 8885, 8886, 8890, 8891, 8894, 8895, 8896, 8898, 8899, 8900, 8901, 8902, 8903	Latham Ballroom	Frank Pfefferkorn, Johnson Samuel

Thursday, June 30, 2016

Time	Event	Location	Facilitator
7:00am - 7:00pm	Registration	Lower Quad	
7:30am - 5:00pm	Exhibits	Latham Foyer	
8:00am - 8:05am	Welcome	Latham Ballroom	Jaime Camelio
8:05am - 9:00am	Keynote: Nanci Hardwick	Latham Ballroom	Jaime Camelio

Concurrent Technical Tracks: 10

9:15am - 10:45am	Dornfeld Symposium 6 - Smart Manufacturing: MSEC papers - 8564, 8629, 8586	Solitude	Scott Smith
	Process, Property, Performance Relationship in Additive Mfg 3: MSEC - 8863, 8684 and NAMRC 117	Alumni Assembly	Kevin Chou, Weilong Cong
	MSEC Session 2-10-2 Processing and Testing of Polymers and Composites 2: MSEC paper 8571, 8638	Smithfield	Fabrizio Quadrini, Catalin Fetecau
	MSEC Session 2-7-4 Scalable Nanomanufacturing 4: MSEC papers 8650, 8835, 8567	Duck Pond	Jorge Correa

Thursday, June 30, 2016

Time	Event	Location	Facilitator
	Mfg Systems: NAMRC - 25, 22, 34	Drillfield	Laine Mears, Dazhong Wu
	NAMRC Forming II: NAMRC - 24, 113	Cascades A	Gracious Ngaile, Jyhwen Wang
	NAMRC Surface II: NAMRC - 91, 93, 75	Cascades B	Bruce Tai, Jingyan Dong
9:15am -10:45am	MSEC Session 2-6-1 Forming 1: MSEC papers 8532, 8649, 8811	Draper's Meadow	Rajiv Malhotra
	MSEC Session 4-9-2 Analytics for System Informatics and Sustainability 2: MSEC papers 8685, 8704, 8717	Ellett Valley	Hui Wang, Qing Change
	MSEC Session 4-11-1 Intelligent Maintenance Decision Making for Manufacturing Systems: MSEC papers 8547, 8615, 8674	Huckleberry	Yong Wang, Zeyi Sun
10:45am -11:00am	Morning Break	Upper Quad	

Concurrent Technical Tracks: 11

	Dornfeld Symposium 7 - Sustainable Mfg. 2: MSEC papers 8642, 8746, 8804	Solitude	John Sutherland
	CAD/CAM Topics in Additive Manufacturing - Session II: NAMRC - 82, 87, 90	Alumni Assembly	Sam Anad, Kevin Chou
	MSEC Session 2-10-3 Advances in Manufacturing of Polymers and Composites: MSEC papers 8528, 8621, 8786	Smithfield	Felicia Stan, Catalin Fetecau
11:00am - 12:30pm	MSEC Session 2-8-1 Modeling, Analysis, and Simulation of Mfg. Processes 1: MSEC papers 8583, 8656, 8739	Duck Pond	Laine Mears
	Mfg Systems: NAMRC - 112, 121, 42	Drillfield	Lihui Wang, Valerie Maier Sperdelozzi
	NAMRC Forming III: NAMRC - 64, 111, 126	Cascades A	Herman Tang, Jyhwen Wang
	NAMRC Cutting V - Turning: NAMRC - 94, 141	Cascades B	Raja Kountanya, Xiaoliang Jin

Thursday, June 30, 2016

Time	Event	Location	Facilitator
11:00am - 12:30pm	MSEC Session 2-6-2 Forming 2: MSEC papers 8533, 8805, 8813	Draper's Meadow	Ihab Ragai
	MSEC Session 4-1-2 Manufacturing Equipment 2: MSEC papers 8643, 8710, 8862	Huckleberry	Keith Bourne, Chao Wang
	MSEC Session 4-9-3 Analytics for System Informatics and Sustainability 3: MSEC papers 8722, 8735, 8750	Ellett Valley	H. John Wang, Weihong Guo
12:30pm - 1:10pm	Lunch	Latham Ballroom	
1:15pm - 2:00pm	SME Awards Luncheon & Founders Address	Latham Ballroom	
Concurrent Technical Tracks: 12			
2:15pm - 3:45pm	Dornfeld Symposium 8 - Sustainable Mfg. 3: MSEC papers - 8517, 8719, 8880	Solitude	Karl Haapala
	Modeling and Simulation of Metal Additive Mfg: MSEC - 8692, 8623, 8819	Alumni Assembly	Terri Jia, Shawn Moylan
	MSEC Session 2-13-1 Machining of Ceramics and Ceramic Matrix Composites: MSEC papers 8510, 8766, 8579	Smithfield	Steven Y. Liang, Patrick Kwon
	MSEC Session 2-8-2 Modeling, Analysis, and Simulation of Mfg. Processes 2: MSEC papers 8595, 8768, 8874	Duck Pond	Zhichao (Charlie) Li
	Mfg Systems: NAMRC - 59, 144, 32	Drillfield	Sam Anand, James Kong
	NAMRC Abrasive Machining: NAMRC - 16, 146	Cascades A	Hongseok Choi, Mark Jackson
	NAMRC Joining II: NAMRC - 9, 96, 107	Cascades B	Hongtao Ding, Wayne Cai
	MSEC Session 2-6-3 Forming 3: MSEC papers 8829, 8839	Draper's Meadow	Rajiv Malhotra
	MSEC Session 4-2-1 Process-Machine-Interactions 1: MSEC papers 8713, 8715, 8857	Ellett Valley	Durul Ulutan, Burak Sencer
MSEC Session 4-9-4 Analytics for System Informatics and Sustainability 4: MSEC papers 8757, 8781, 8854	Huckleberry	Ran Jin, Hui Wang, Chenhui Shao	

Thursday, June 30, 2016

Time	Event	Location	Facilitator
3:45pm - 4:00pm	Afternoon break	Upper Quad	
Concurrent Technical Tracks: 13			
4:00pm - 5:30pm	Dornfeld Symposium 9 -Sustainable Mfg. 4: MSEC papers 8730, 8639, 8682	Solitude	Barbara Linke
	Mfg Systems: NAMRC - 37, 110	Drillfield	Shing Chang, Wei Li
	NAMRC Cutting VI - Drilling: NAMRC - 2, 130, 43	Cascades A	Wilfredo Moscoso-Kingsley, Tony Schmitz
	MSEC Session 2-6-4 Forming 4: MSEC papers 8753, 8756, 8852	Cascades B	Gracious Ngaile
	MSEC Session 2-8-3 Modeling, Analysis, and Simulation of Mfg. Processes 3: MSEC papers 8708, 8724, 8577	Duck Pond	Arif Malik
6:00pm - 8:30pm	MSEC Session 4-8-1 High Performance Computing and Data Analytics in Manufacturing: MSEC papers 8525, 8559, 8625	Draper's Meadow	Dazhong Wu, Janis Terpenney
	MSEC Session 4-2-2 Process-Machine-Interactions 2: MSEC papers 8665, 8872	Ellett Valley	Burak Sencer, Alex O'Connor
6:00pm - 8:30pm	Early Career Forum & Student Reception	Latham A	

Friday, July 1, 2016

Time	Event	Location	Facilitator
9:00am - 11:00am	Information desk	Lower Quad	
11:00am - 11:30am	Tour Check-in	1st Floor Lobby	
11:30am	Depart for tours (Volvo and Cascades)	1st Floor Lobby	



Dear Colleagues,

As the organizers of the NAMRC44/MSEC2016, and on behalf of the entire manufacturing research and education group at Virginia Tech, we welcome you to Blacksburg and are excited to share our world-class facilities with you.

The conference is the result of the outstanding efforts of many people. We would like to thank all of the authors for their technical paper and poster submissions, the host Organizing Committee, the Conference Coordinating Committee, the NAMRI/SME Scientific Committee, and the ASME MED Executive and Technical Committees, along with the National Science Foundation. We would also like to thank our keynote speakers: Mike Molnar, Dr. Shridhar Kota, Professor Fritz Klocke, and Nanci Hardwick.

We hope you enjoy your visit to Virginia Tech, and find the conference useful in expanding your technical knowledge, as well as your network of contacts within the manufacturing research community. Enjoy the conference!

Jaime Camelio

Conference Host

Rolls-Royce Commonwealth Professor of Advanced Manufacturing

Grado Department of Industrial and Systems Engineering

Virginia Tech





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North American Manufacturing
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Student Travel Award Recipients

A National Science Foundation grant will provide support to select students from US institutions to attend the collocated 2016 ASME Manufacturing Science and Engineering Conference (MSEC2016) and the SME 44th North American Manufacturing Research Conference (NAMRC44), at Virginia Tech, June 27 – July 1, 2016.

The organizers of NAMRC44/MSEC2016 gratefully acknowledge the generous support of the National Science Foundation in providing financial support to the following students to attend the conference:

- Amin Abedini, University of Kentucky
- Saheem Absar, Clemson University
- Amm Nazmul Ahsan
- Farbod Akhavan Niaki, Clemson University
- Bruno Azeredo, University of Illinois, Urbana–Champaign
- Gregory Bales, University of California, Davis
- Shalu Bansal, Oregon State University
- Mina Bastwros, Iowa State University
- Russell Borduin, University Texas, Austin
- Anne Brant, University of Cincinnati
- Tizian Bucher, Columbia University
- Wei Chen, Carnegie Mellon University
- Bo Cheng, University Alabama
- Liang Cong, Purdue University
- Navid Dabir Moghaddam, Illinois Institute of Technology
- Jia Deng, North Carolina State University
- Houzhu Ding, Stevens Institute of Technology
- Xin Dong, University of Michigan, Ann Arbor
- Palamandadige Fernando, Kansas State Univeristy
- Daniel Franke, University of Wisconsin, Madison
- Tyler Grimm, Penn State, Erie
- Azadeh Haghighi, Univeristy of Illinois, Cahicago
- Yiwei Han, North Carolina State University
- Yingbin Hu, Texas Tech
- Hamdy Ibrahim, University of Toledo
- Connor Jennings, Pennsylvania State University
- Zhengqian Jiang, Florida State University
- Ariyan Muhammad Kabir, University Maryland
- Sajad Kafashi, University North Carolina, Charlotte
- Sinan Kesriklioglu, University of Wisconsin, Madison
- Dong Sung (Danny) Kim, Texas A&M University
- Arkadeep Kumar, Georgia Tech
- Josh Langsfeld, University of Maryland
- Lin Li, North Carolina State University
- Ting Chiang (Jason) Lin, University of California, LA
- Jingfu Liu, University of Alabama
- Lu Lu, University of Illinois, Chicago
- Roby Lynn, Georgia Tech
- Huachao Mao, University of Southern California
- Ardeshir Raihanian Mashhadi, SUNY, Buffalo
- Patrick Scot McNeff, Oregon State University
- Maxwell Micali, University of California, Berkeley
- Benjamin Mitchell, University of New Hampshire
- Hadi Miyanaji, University of Louisville
- Hossein Mohammadi, Western Michigan University
- Trey Neveux, Penn State, Erie
- Jacklyn Niebauer, Penn State, Erie
- Fuda Ning, Texas Tech
- Xinyan Ou, Stony Brook University
- Rapeepan Promyoo, Indiana University, Purdue University
- Manik Rajora, Georgia Tech
- Kamyar Raoufi, Oregon State University
- Huaqing Ren, Northwestern University
- Jie Ren, Florida State University
- Zhencheng Ren, University of Akron
- Daniel Ross, University of Florida
- Brandt Ruszkiewicz, Clemson University
- Roozbeh Salary, SUNY, Binghamton
- Erika Salem, University of Michigan, Ann Arbor
- Shantanu Shahane, University of Illinois, Urbana–Champaign
- Ninggang Shen, University of Iowa
- Shingo Tajima, Oregon State University
- Sirisak Tooptong, Michigan State University
- M. Samie Tootooni, SUNY, Binghamton
- Rohan Vaidya, University of Cincinnati
- Xiaoqing Wang, University of Alabama
- Yachao Wang, University of Cincinnati
- Sarah Wolff, Northwestern University
- Honghan Ye, University of Kentucky
- Xiaoming Yu, Kansas State University
- Anil Yuksel, University of Texas - Austin
- Feng Zhang, SUNY, Buffalo
- Mengyun Zhang, Texas Tech
- Ruixia Zhang, University of Akron
- Weizhao Zhang, Northwestern University
- Yi Zhang, Indiana University, Purdue University
- Ying Zhang, Texas A&M University
- Jingnan Zhao, Iowa State University
- Jingyi Zhao, University of Akron
- Jingzhou (Frank) Zhao, University of California, LA
- Yihao Zheng, University of Michigan, Ann Arbor
- Jing Zou, Stony Brook University

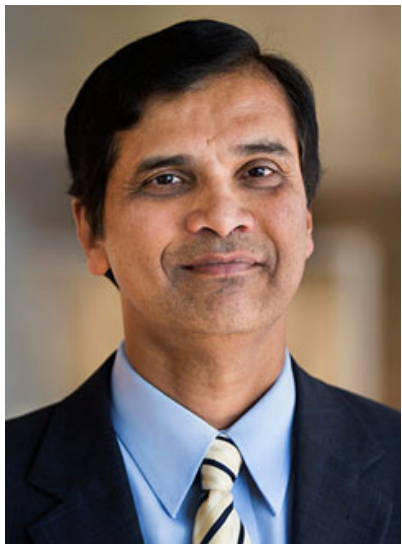


Michael F. Molnar, PE CMfgE FSME FASME SES
**National Institute of Standards and Technology,
U.S. Department of Commerce**

Mike Molnar is the founding director of the interagency Advanced Manufacturing National Program Office (AMNPO), with a mission to foster industry-

led partnerships and to form a “whole of government” approach to strengthen competitiveness and innovation in U.S. manufacturing. This interagency team is responsible for designing and establishing the National

Network for Manufacturing Innovation (NNMI), a Presidential and Congressionally authorized initiative with now eight established institutes with seven more in the pipeline. For more information please see www.manufacturing.gov Mike also leads the NIST Advanced Manufacturing Office (AMO), which coordinates extramural programs for the National Institute of Standards and Technology, part of the U.S. Department of Commerce. The AMO has now launched the first “open topic” NNMI Institutes competition, where any topic may be proposed. For additional information see www.nist.gov/amo



Dr. Sridhar Kota
Herrick Professor of Engineering, Professor of Mechanical Engineering, and the Director of the Institute for Manufacturing Leadership, at the University of Michigan in Ann Arbor. He is the founding Director of MForesight: The Alliance for Manufacturing Foresight.

MForesight: The Alliance for Manufacturing Foresight was launched in October 2015 with funding provided

by NSF and NIST. MForesight serves as the voice of the national advanced manufacturing community to the public and provides the federal government with intelligence about emerging technologies to shape priorities for future federal and private sector investment and set the

trajectory of U.S. advanced manufacturing. MForesight provides the federal government with intelligence about nascent and emerging technologies that will shape priorities for future U.S. investment in advanced manufacturing. MForesight will identify emerging technologies in advanced manufacturing—highlighting newly identified fields of basic, translational, and interdisciplinary research—as well as related technology and infrastructure creation, including private sector participation.



Professor Fritz Klocke
Head of the Fraunhofer Institute for Production Technology IPT and Chair for Manufacturing Technology, Werkzeugmaschinenlabor, RWTH Aachen

Welfare and economic growths are inseparable. People do have individual and collective needs and natural resources do come to an

end. One of the biggest challenges is to realize economic growth with less resource consumption. Jung-Hoon Chun from MIT presented a report that this goal is still far away. The President of Fraunhofer Gesellschaft, Professor Reimund

Neugebauer, launched a research project in which strong focus is put on the design of energy- and resource-efficient production lines, layout of zeroemission factories and taking into account the working conditions of people. In this presentation research result and practical examples will be given to trigger further research and motivate companies to go for the implementation of sustainable production facilities. In this context a particular focus will also be put on the Industrie 4.0 initiative to analyze the potential of smart services in developing sustainable production networks.



Nanci Hardwick
CEO Aeroprobe Corporation

Nanci Hardwick is CEO of Aeroprobe Corporation, her second successful start-up. Aeroprobe provides air data measurement systems to aerospace, automotive,

turbomachinery, wind turbine, and wind tunnel testing industries around the world. Aeroprobe's air data systems for unmanned

aircraft provide real time air speed, angle of attack and angle of sideslip for improved flight performance. Nanci is an avid supporter of regional technology and business development. She was recently appointed president of the AUVSI Western Virginia Chapter and serves as vice-chair on the board of the New River Valley Economic Development Alliance (NRVEDA). Nanci has been recognized by Governor McDonnell for leadership in community and business and was named one of the "Top 20 under 40" business leaders in the region by the Blue Ridge Business Journal.



Tuesday, June 28, 2016

9:15AM - 10:45AM	Room	Page
NAMRC: Komanduri Symposium	Solitude	
NAMRC: NNMI Manufacturing Implementation	Drillfield	
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MSEC 2-1: Assisted / Augmented Manufacturing Processes I	Huckleberry	
MSEC 2-4: Advances in Solid-State Manufacturing Processes	Duck Pond	
MSEC 2-14: Advances in Composites Manufacturing Processes	Ellet Valley	
MSEC 4-3: Cyber-Physical Systems, Stochastic Modeling, and Sensor Networks	Cascades B	
MSEC 4-6: Cloud Manufacturing: An Industrial Perspective	Cascades A	
MSEC 5-4: Invited Talk	Almuni Assembly	

11:00AM - 12:30PM	Room	Page
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NAMRC: NNMI Mfg Education & Workforce Development	Smithfield	
MSEC 1-2: Advances in Manufacturing of Engineered Material Systems	Cascades B	
MSEC 2-2: Advances in Assisted/Augmented Manufacturing Processes	Duck Pond	
MSEC 2-4: Solid-State Joining 2	Huckelberry	
MSEC 2-14: Advanced in Composites Manufacturing Processes	Draper's Meadow	
MSEC 4-6: Cloud Manufacturing: An Industrial Perspective	Cascades A	
MSEC 5-3: Advances in Sustainable Manufacturing Processes	Almuni Assembly	
MSEC 9-1: Student Manufacturing Design Competitions	Ellet Valley	



Tuesday, June 28, 2016

2:00PM - 3:30PM

	Room	Page
NAMRC: Komanduri Symposium	Solitude	
NAMRC: NNMI Mfg Education & Workforce Development	Smithfield	
NAMRC: Additive Manufacturing Symposium- Session	Almuni Assembly	
NAMRC: Forming 1	Cascades A	
NAMRC: Cutting I - Milling	Cascades B	
MSEC 1-2: Novel Meta Structures	Duck Pond	
MSEC 2-5: Abravise Machining	Draper's Meadow	
MSEC 4-4: Advances in Data Infrastructures for Manufacturing Operations Planning and Control	Drillfield	
MSEC 5-1: Model Definition and Systems Engineering	Huckleberry	
MSEC 8-2: Process, Property, Performance Relationship in Additive Mfg. 1	Almuni Assembly	
MSEC 9-1: Student Manufacturing Design Competitions 2	Ellet Valley	

3:45PM - 5:15PM

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NAMRC: Novel Topics in Additive Manufacturing I	Almuni Assembly	
NAMRC: Surface I	Cascades A	
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MSEC-NAMRC NNMI Panel: Workforce Development	Smithfield	
MSEC 2-1: Energy Field Manufacturing Process I	Ellet Valley	
MSEC 2-2: Assisted / Augmented Manufacturing Processes III	Duck Pond	
MSEC 2-5: Machine Design	Draper's Meadow	
MSEC 4-4: Advances in Data Infrastructures for Manufacturing Operations Palling and Control	Drillfield	
MSEC 5-1: Manufacturing Information Management	Huckleberry	
MSEC 8-3: Mfg. Education & Workforce Development 3	Smithfield	

Tuesday, June 28, 2016

9:15am – 10:45am NAMRC: Komanduri Symposium

Solitude *Session Chairs: Shiva Raman and Satish Bukkapatnam*

NAMRC44- 137	Changqing Cheng, Satish Bukkapatnam, Lionel Raff and Ranga Komanduri Fast Monte Carlo	Simulation-based Process Design and Planning for Carbon Nanotube Synthesis
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9:15am – 10:45am NAMRC: NNMI Manufacturing Implementation

Drillfield *Session Chairs: John Agapiou and Hongliang Wang*

NAMRC44- 101	Saeid Bahremand, Hoo Sang Ko, Shahram Moradi	Implementation of Just-in-Time Manufacturing Systems
NAMRC44- 147	Annarita Giani, Benjamin Beckmann, John Carbone, Peter Koudal, Joseph Salvo, James Barkley	Developing the Digital Manufacturing Commons
NAMRC44- 119	Matthew Krugh, Kavita Antani, Laine Mears, Jörg Schulte	Prediction of Defect Propensity for the Manual Assembly of Automotive Electrical Connectors

9:15am – 10:45am MSEC 1-2: Cellular Materials

Draper's Meadow *Session Chair: Sameh Tawfick*

MSEC2016-8849	Daniel Cellucci, Kenneth Cheung	Evaluation of Cellular Solids Derived From Triply Periodic Minimal Surfaces Technical Publication
MSEC2016-8767	Benjamin Jenett, Daniel Cellucci, Christine Gregg, Kenneth Cheung	Meso-Scale Digital Materials: Modular, Reconfigurable, Lattice-Based Structures
MSEC2016-8837	Matthew Carney, Benjamin Jenett	Relative Robots: Scaling Automated Assembly of Discrete Cellular Lattices

Tuesday, June 28, 2016

9:15am – 10:45am MSEC 2-1: Assisted/Augmented Manufacturing Processes I
Huckleberry *Session Chairs: Burak Sencer, Abram Pleta*

MSEC2016-8554	Brandt Ruszkiewicz, Laine Mears	Electrically Assisted Compression of Tungsten Carbide and Its Implications for Electrically Assisted Machining
MSEC2016-8555	Brandt Ruszkiewicz, Laine Mears	Temperature Controlled Forming of 7075-T6 Aluminum Using Linearly Decaying Direct Electric Current
MSEC2016-8736	Abdelrahim Khal, Brandt Ruszkiewicz, Laine Mears	Springback Evaluation of 304 Stainless Steel in an Electrically Assisted Air Bending Operation

9:15am – 10:45am MSEC 2-4: Advances in Solid-State Manufacturing Processes

Duck Pond *Session Chair: Nelish Kumar*

MSEC2016-8512	Piyush Upadhyay, Saumyadeep Jana, Leonard S Fifield	Joining Dissimilar Materials Using Friction Stir Scribe Technique
MSEC2016-8747	Daniel Franke, Justin Morrow, Neil Duffie, Michael Zinn, Frank E. Pfefferkorn	Towards Improved Hybrid Joining of Aluminum Alloys to Carbon Fiber Composites with Friction Stir Welding
MSEC2016-8770	Karthik Alagarsamy, Nilesh Kumar, Rajiv Mishra	Investigation of Thermo-Mechanical Processing and Mechanical Properties of CoCrFeNiMn High Entropy Alloy for Peripheral Vascular Stent Application

Tuesday, June 28, 2016

9:15am – 10:45am MSEC 2-14: Advances in Composites Manufacturing Processes

Ellet Valley

Session Chairs: Daniel Walczyk, David Hauber

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|---------------|--|--|
| MSEC2016-8864 | Lai Jiang, Daniel Walczyk, Gavin McIntyre | A New Approach to Manufacturing Biocomposite Sandwich Structures: Mycelium-Based Cores |
| MSEC2016-8864 | Azmi Harun, Che Hassan Che Haron, Jaharah A. Ghani, Suhaily Mokhtar, Asmawi Sanuddin | Fundamental Study on Delamination in Milling Kenaf Fiber Reinforced Plastic Composite (Unidirectional) |
| MSEC2016-8531 | Azmi Harun, Che Hassan Che Haron, Jaharah A. Ghani, Suhaily Mokhtar, Asmawi Sanuddin | Fundamental Study on Delamination in Milling Kenaf Fiber Reinforced Plastic Composite (Unidirectional) |
| MSEC2016-8773 | Mohamed Hashish, Amanda Kotchon | Machining of CMCS Ceramics and Carbiides with AWJ |

9:15am – 10:45am MSEC 4-3: Cyber-Physical Systems, Stochastic Modeling, and Sensor Networks

Cascades B

Session Chairs: Dongping Du, Zimo Wang

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|---------------|---|---|
| MSEC2016-8660 | Ariyan Kabir, Joshua Langsfeld, Cunbo Zhuang, Krishnanand Kaipa | Automated Learning of Operation Parameters for Robotic Cleaning by Mechanical Scrubbing |
| MSEC2016-8661 | Krishnanand Kaipa, Shaurya Shriyam, Nithyananda Kumbla | Resolving Occlusions Through Simple Extraction Motions in Robotic Bin-Picking |
| MSEC2016-8663 | Joshua Langsfeld, Ariyan Kabir, Krishnanand Kaipa | Online Learning of Part Deformation Models in Robotic Cleaning of Compliant Objects |

Tuesday, June 28, 2016

9:15am – 10:45am MSEC 4-6: Cloud Manufacturing: An Industrial Perspective
Cascades A *Session Chairs: Xun Xu, Lihui Wang*

MSEC2016-8530	Longfei Zhou, Lin Zhang, Yuyan Xu	Research on the Relationships of Customized Service Attributes in Cloud Manufacturing
MSEC2016-8572	Soheil Hassanzadeh, Kai Cheng	Manufacturing Supplier Selection in Cloud Manufacturing Context and Its Implementation and Application Perspective
MSEC2016-8581	Nenad Ivezic, Miroslav Ljubicic, Serm Kulvatunyou, Scott Nieman, Con-rad Leiva, Zoran Marjanovic	Towards Business Process Catalog for Cloud-Enabled Service-Oriented Architectures

9:15am – 10:45am MSEC 5-4: Invited Talk
Almuni Assembly Hall *Session Chairs: Barbara Linke, Moneer Helu*

MSEC2016-8912	Julian Allwood	Manufacturing in a Low Energy Future
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Tuesday, June 28, 2016

11:00am – 12:30pm NAMRC: Komanduri Symposium

Solitude *Session Chairs: Shivakumar Raman and Satish Bukkapatnam*

NAMRC44-71	Masahiko Yoshino	Effects of External Hydrostatic Pressure on Orthogonal Cutting Characteristics
NAMRC44-74	Hitomi Yamaguchi, Patrick Hendershot, Radu Pavel, Jonathan Iverson	Polishing of Uncoated Cutting Tool Surfaces for Extended Tool Life in Turning of Ti-6Al-4V
NAMRC44-133	Zimo Wang, Vivekananda Kovvuri, Ana Carla Araujo, Marcio Bacci, Wayne N.P. Hung, Satish T.S. Bukkapatnam	Built-up-Edge Effects on Surface Deterioration in Micromilling Processes

11:00am – 12:30pm NAMRC Joining I

Drillfield *Session Chairs: Herman Tang and Wayne Cai*

NAMRC44-48	Ninggang Shen, Avik Samanta, Hongtao Ding, Wayne Cai	Simulating Microstructure Evolution of Ultrasonic Welding of Battery Tabs
NAMRC44-26	Gianluca Buffa, Dario Baffari, Davide Campanella, Livan Fratini	An innovative Friction Stir Welding based technique to produce dissimilar light alloys to thermoplastic matrix composite joints
NAMRC44-115	Pavan Pasumarthi, Saheem Absar, Hongseok Cho	The Effect of Geometrical Parameters on the Characteristics of Ultrasonic Processing for Metal Matrix Nanocomposites (MMNCs)



Tuesday, June 28, 2016

**11:00am – 12:30pm NAMRC: NNMI Mfg Education & Workforce Development
Smithfield** **Session Chairs: Gloria Wiens and Bryan Chu**

NAMRC44-57	John Abbitt, Sam Lowry	Implementing the Digital Design Process for the Development of a Centrifugal Fan Impeller in the Undergraduate Engineering Curriculum
NAMRC44-104	Farhad Ghadamli, Barbara Linke	Development of a Desktop Hybrid Multipurpose Grinding and 3D Printing Machine for Educational Purposes
NAMRC44-142	Roby Lynn, Christopher Saldana, Thomas Kurfess, Sai Nithin Reddy Kantareddy, Timothy Simpson, Kathryn Jablokow, Thomas Tucker, Saish Tedia, Christopher Williams Toward	Rapid Manufacturability Analysis Tools for Engineering Design Education

11:00 AM - 12:30 PM MSEC 1-2: Advances in Manufacturing of Engineered Material Systems
Cascades B **Session Chairs: Sameh Tawfick, Rebecca Kramer**

MSEC2016-8627	Will Langford, Amanda Ghassaei, Neil Gershenfeld	Automated Assembly of Electronic Digital Materials
MSEC2016-8654	Michelle Yuen, Rebecca Kramer	Fabricating Microchannels in Elastomer Substrates for Stretchable Electronics

Tuesday, June 28, 2016

11:00 AM - 12:30 PM MSEC 2-2: Advances in Assisted/Augmented Manufacturing Processes

Duck Pond

Session Chairs: Mohammad Sima, Farbod Akhavan Niaki

MSEC2016-8565	Varun Sharma, Pulak M. Pandey	Study of Ultrasonic Assisted Turning of 4340 Steel With Plane and Self-Lubricating Cutting Inserts
MSEC2016-8605	Mina Bastwros, Gap-Yong Kim	Fabrication of Custom Pattern Reinforced AZ31 Multilayer Composite Using Ultrasonic Spray Deposition
MSEC2016-8611	Palamandadige K S C Fernando, Zhijian Pei, Meng (Peter) Zhang, Xiaoxu Song	Rotary ultrasonic drilling of CFRP: Effect of process parameters on delamination

11:00 AM - 12:30 PM MSEC 2-4: Solid-State Joining 2

Huckleberry

Session Chair: Wayne Cai

MSEC2016-8695	B.K. Dhindaw, Priyadarshini Jayashree, Par-tha Sarathi De,	Friction Stir Welding of Aluminum Alloy 1100 and Titanium-Al Alloy
MSEC2016-8841	Amir Poudel, Aleksandra Fortier, Nilesh Kumar, Rajiv Mishra, Kyu C. Cho, Raymond E. Brennan, Kevin J. Doherty	Intermetallic Compound Formation Control in Aluminum to Magnesium Alloy Weld Joint Using Friction Stir Welding
MSEC2016-8599	Marzyeh Moradi, Man-Kwan Ng, Taekyung Lee, Jian Cao, Yoosuf N. Picard	Interface Characterization of AL-CU Micro-Laminates Fabricated by Electrically-Assisted Roll Bonding

Tuesday, June 28, 2016

11:00 AM - 12:30 PM MSEC 2-14: Advanced in Composites Manufacturing Processes

Draper's Meadow *Session Chairs: Daniel Walczyk, David Hauber*

MSEC2016-8606	Jipeng Chen, Lin Gu, Wansheng Zhao, Shanghai Jiao Tong University, Shanghai, China	Experimental Study on Blasting Erosion Arc Machining of 50 Vol% SiC/Al Matrix Composites
MSEC2016-8607	Arturo Bautista, Juan Aguado, Yong Gan	Electrospun Sodium-Cobalt Oxide Ceramic Nanofiber and the Electromagnetic Responses
MSEC2016-8683	Yachao Wang, Jing Shi, Shiqiang Lu, Yun Wang, Nanchang Hangkong	Selective Laser Melting of Graphene Reinforced Inconel 718 Superalloy: Evaluation of Microstructure and Tensile Performance

11:00 AM - 12:30 PM MSEC 4-6: Cloud Manufacturing - an Industrial Perspective

Cascades A *Session Chairs: Goran Adamson, Lei Ren*

MSEC2016-8726	Yongkui Liu, T Xun Xu	Industry 4.0 and Cloud Manufacturing: A Comparative Analysis
MSEC2016-8658	Benjamin Gernhardt, Tobias Vogel, Mohammad Givehchi, Lihui Wang, Mat-thias Hemmje	Knowledge-based production planning within the reference planning process supporting manufacturing change management
MSEC2016-8538	Yijing Wang, Tao Peng	Speculations on the Market Evolution of Cloud Manufacturing

Tuesday, June 28, 2016

11:00 AM - 12:30 PM MSEC 5-3: Advances in Sustainable Manufacturing Processes

Alumni Assembly
Hall

Session Chairs: Chandra Nath, Barbara Linke

MSEC2016-8748	Jung Sub Kim, Jin Woo Kim, Young Chang Kim, Sang Won Lee	Experimental Study on Environmentally-Friendly Micro End-Milling Process of Ti-6Al-4V Using Nanofluid Minimum Quantity Lubrication With Chilly Gas
MSEC2016-8618	Zhichao Liu, Qihong Jiang, Yang Zhang, Tao Li, Dalian Hong-Chao Zhang	Sustainability of 3D Printing: A Critical review and recommendations
MSEC2016-8744	Khalid Mustafa, Kai Cheng	Managing Complexity in Manufacturing Changeovers: A Sustainable Manufacturing-Oriented Approach and the Application Case Study

11:00 AM - 12:30 PM MSEC 9-1: Student Manufacturing Design Competitions

Ellet Valley

Session Chairs: Y. Kevin Chou, Radu Pavel

MSEC2016-8904	James Garofalo	Rensselaer Carabiner
MSEC2016-8905	William Boettcher	HighPerformance Thermoelectric Printbed
MSEC2016-8906	Mark Rubeo	The Design of a Multiple Degree of Freedom Flexure Stage with Tunable Dynamics for Milling Experimentation
MSEC2016-8910	Samuel Cole	Micro Tube Bending Machine

Tuesday, June 28, 2016

2:00pm – 3:30pm NAMRC: Komanduri Symposium

Solitude

Session Chairs: I.S Jawahir, Shreyes Melkote

NAMRC44-3	Vinh Nguyen, Shreyes Melkote, Amar Deshamudre, Maneesh Khanna, Dan Walker PVDF	Sensor Based Monitoring of Single-Point Cutting
NAMRC44-140	Jean Garcia-Gonzalez, Wilfredo Moscoso-Kingsley, Viswanathan Madhavan	Tool Rake Face Temperature Distribution when Machining Ti6Al4V and Inconel 718
NAMRC44-128	Abram Pleta, Laine Mears	Cutting Force Investigation of Trochoidal Milling in Nickel-Based Superalloys

2:00pm – 3:30pm NAMRC: NNMI Mfg Education & Workforce Development

Smithfield

Session Chairs: Hitomi Yamaguchi, Haley Stevens

NAMRC44-138	Albert Shih, Bruce Tai, Roland Chen, Lei Chen, Yihao Zheng, Yancheng Wang	Video Enriched Pedagogy in Manufacturing Processes
NAMRC44-139	Johnson Samuel, Clayson Spackman, Lawrence Ruff, Jerome Crucetti, Samuel Chiappone, Linda Schadler	A Research University and Community College Collaboration Model to Promote Micro-manufacturing Education: Preliminary Findings
NAMRC44-155	Chitra Javdekar, Elizabeth Watson, Valerie Kapilow, Marina Bograd, Phara Boyer, Ibrahim Zeid, Claire Duggan	Closing the Advanced Manufacturing Talent Gap

2:00pm – 3:30pm NAMRC: Additive Manufacturing Symposium- Session

Alumni Assembly Hall

Session Chairs: Bashir Khoda, Chi Zhou

NAMRC44-118	Sarah Wolff, Taekyung Lee, Eric Faierson, Kornel Ehmann, Jian Cao	Anisotropic Properties of Directed Energy Deposition (DED)-Processed Ti-6Al-4V
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Tuesday, June 28, 2016

2:00pm – 3:30pm NAMRC: Forming 1

Cascades A

Session Chairs: Stefani Bruschi and Gracious Ngaile

NAMRC44-129	Rashid Khan, Fahad Zahedi, Ali Siddiqui	Numerical Modeling of Twinning Induced Plasticity in Austenite based Advanced High Strength Steels
NAMRC44-143	Erika Salem, Jaekwang Shin, Maya Nath, Mihaela Banu, Alan Taub	Investigation of Strain Path on the Thickness Variation in Single Point Incremental Forming
NAMRC44-69	Kamlesh Phapale, Ramesh Singh, Sandip Pati	Delamination Characterization and Comparative Assessment of Delamination control techniques in Abrasive Water Jet drilling of CFRP

2:00pm – 3:30pm NAMRC: Cutting I - Milling

Cascades B

Co-chairs: Raja Kountanya, Xiaoliang Jin

NAMRC44-8	Isabela Castanhera, Anselmo Diniz	High Speed Milling of Hardened Steel Convex Surface
NAMRC44-29	Maksym Ziberov, Marcio Bacci Da Silva, Mark Jackson, Wayne Hung	Effect of Cutting Fluid on Micromilling of Ti-6Al-4V Titanium Alloy
NAMRC44-33	Shan Luo, Martin B.G. Jun, Zuomin Dong	Numerical Simulation of Chip Ploughing Volume and Forces in 5-axis CNC Micro-milling Using Flat-end Mills

2:00pm - 3:30pm MSEC 1-2: Novel Meta Structures

Duck Pond

Session Chairs: Sameh Tawfick, Kenneth Cheung

MSEC2016-8754	Ala Qattawi	Optimizing Origami-Based Sheet Metal Parts Using Traversal Algorithms and Manufacturing Based Indices
MSEC2016-8668	Daniel Farbman, Chris McCoy	Materials Testing Of 3D Printed ABS And PLA Samples To Guide Mechanical Design
MSEC2016-8755	Tanveer Islam, Prasanna Gandhi	Spontaneous Fabrication Of Three Dimensional Multi-Scale Fractal Structures Using Hele Shaw Cell

Tuesday, June 28, 2016

2:00pm - 3:30pm MSEC 2-5: Abravise Machining

Draper's Meadow *Session Chairs: Barbara Linke, Mark Jackson*

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|---------------|--------------------------------|---|
| MSEC2016-8585 | Xun Chen, Michael Morgan | Advances in Quality and Productivity in Precision Grinding: A Review of Selected Research |
| MSEC2016-8876 | Jeffrey Badger, Mike Hitchiner | Grinding knowledge in academia vs. grinding knowledge on the flop floor |

2:00pm - 3:30pm MSEC 4-4: Advances in Data Infrastructures for Manufacturing Operations Planning and Control

Drillfield *Session Chairs: Moneer Helu*

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|---------------|--|--|
| MSEC2016-8666 | Anantha Narayanan, Alec Kanyuck, Satyandra Gupta, Sudarsan Rachuri | Machine Condition Detection for Milling Operations Using Low Cost Ambient Sensors |
| MSEC2016-8783 | Moneer Helu, Brian Weiss | The Current State of Sensing, Health Management, and Control for Small-to-Medium-Sized Manufacturers |
| MSEC2016-8769 | Joel Neidig | The Gamification of the Industrial Internet of Things using Modern Protocols |

2:00pm - 3:30pm MSEC 5-1: Model Definition and Systems Engineering

Huckelberry *Session Chairs: Thomas Hedberg, Jr., Nathan Hartman*

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|---------------|---|---|
| MSEC2016-8603 | David Long | Systems Engineering and Manufacturing? Closing the Gap |
| MSEC2016-8702 | Shawn Ruemler, Kyle Zimmerman, Nathan Hartman, Thomas Hedberg, Jr., Allison Barnard Feeney | Promoting Model-Based Definition to Establish a Complete Product Definition |
| MSEC2016-8792 | Asa G. Trainer, Thomas Hedberg, Jr., Allison Barnard Feeney, Kevin Fischer, Rockwell Collins, Phil Rosche | Gaps Analysis of Integrating Product Design, Manufacturing, and Quality Data in the Supply Chain Using Model-Based Definition |

Tuesday, June 28, 2016

2:00pm - 3:30pm MSEC 4-4: Advances in Data Infrastructures for Manufacturing Operations Planning and Control

Drillfield *Session Chairs: Moneer Helu*

MSEC2016-8666	Anantha Narayanan, Alec Kanyuck, Satyandra Gupta, Sudarsan Rachuri	Machine Condition Detection for Milling Operations Using Low Cost Ambient Sensors
MSEC2016-8783	Moneer Helu, Brian Weiss	The Current State of Sensing, Health Management, and Control for Small-to-Medium-Sized Manufacturers
MSEC2016-8769	Joel Neidig	The Gamification of the Industrial Internet of Things using Modern Protocols

2:00pm - 3:30pm MSEC 5-1: Model Definition and Systems Engineering

Huckelberry *Session Chairs: Thomas Hedberg, Jr., Nathan Hartman*

MSEC2016-8603	David Long	Systems Engineering and Manufacturing? Closing the Gap
MSEC2016-8702	Shawn Ruemler, Kyle Zimmerman, Nathan Hartman, Thomas Hedberg, Jr., Allison Barnard Feeney	Promoting Model-Based Definition to Establish a Complete Product Definition
MSEC2016-8792	Asa G. Trainer, Thomas Hedberg, Jr., Allison Barnard Feeney, Kevin Fischer, Rockwell Collins, Phil Rosche	Gaps Analysis of Integrating Product Design, Manufacturing, and Quality Data in the Supply Chain Using Model-Based Definition

2:00pm - 3:30pm MSEC 8-2: Process, Property, Performance Relationship in Additive Mfg. 1

Alumni Assembly Hall *Session Chair: Chi Zhou*

MSEC2016-8561	Fuda Ning, Weilong Cong, Zhenyuan Jia, Fuji Wang, Meng (Peter) Zhang	Additive Manufacturing of CFRP Composites Using Fused Deposition Modeling: Effects of Process Parameters
MSEC2016-8791	Yi-Tang Kao, Ying Zhang, Jyhwen Wang, Bruce Tai	Loading-Unloading Cycles of 3D-Printing Built Bi-Material Structures With Ceramic and Elastomer

Tuesday, June 28, 2016

2:00pm - 3:30pm MSEC 9-1: Student Manufacturing Design Competitions 2
Ellet Valley *Session Chairs: Y. Kevin Chou, Radu Pavel*

MSEC2016-8907	Morgan Schweitzer	DeskBuddy
MSEC2016-8908	Zain Shariff	Automated Cross Hatch Adhesion Test
MSEC2016-8909	Zackary Snow	System of Large Additive Manufacturing Robotics
MSEC2016-8911	Xin Dong	Vibration Assisted Nanopositioning Stage



Tuesday, June 28, 2016

3:45pm – 5:15pm NAMRC: Komanduri Symposium
Solitude *Session Chairs: Satish Bukkapatnam, Prahlad Rao*

NAMRC44-5	Prahalad Rao, M. Samie Tootooni, Chenang Liu, David Roberson, Satish Bukkapatnam, Ryan Donovan, Rajesh Sivasubramony, Zhenyu James Kong	Online Non-contact Surface Finish Measurement in Machining using Graph-based Image Analysis
NAMRC44-68	Malarvizhi Sankaranarayananasamy, Akshay Chaudhari, Keng Soon Woon, A. Senthil Kumar, Rahman Mustafizur	Influence of burnishing axial interference on hole surface quality in deep hole drilling of Inconel 718
NAMRC44-13	Harish Kumar, Sehijpal Singh Khangura, Anil Srivastava	Parametric Investigations into Internal Surface Modification of Brass Tubes with Alternating Magnetic Field

3:45pm – 5:15pm NAMRC: Novel Topics in Additive Manufacturing I
Assembly Hall *Session Chairs: Murali Sundaram and Jarred Heigel*

NAMRC44-127	Wei Du, Qian Bai, Bi Zhang	A Novel Method for Additive/Subtractive Hybrid Manufacturing of Metallic Parts
NAMRC44-35	Suchana Akter Jahan, Tong Wu, Yi Zhang, Hazim El-Mounayri, Andres Tovar, Jing Zhang, Xingye Guo, Weng Hoh Lee, Razi Nalim, Douglas Acheson	Implementation of Conformal Cooling and Topology Optimization in 3D Printed Stainless Steel Porous Structure Injection Molds

3:45pm – 5:15pm NAMRC: Surface I
Cascades A *Co-chairs: Herman Tang and Steven Schmid*

NAMRC44-67	Z.Y. Liu, Y.B. Guo, C.Z. Huang	Kinematic Modeling and Deformation Mechanics in Shot Peening of Functional Ceramics
NAMRC44-78	Kyle Jones, Steven Schmid	Experimental Investigation of Laser Texturing and Its Effect on Friction and Lubrication
NAMRC44-149	Sandip Patil	The influence of cutting heat on the surface integrity during machining of titanium alloy Ti6Al4V



Tuesday, June 28, 2016

3:45pm – 5:15pm NAMRC: Cutting II- Turning

Cascades B *Session Chairs: Patrick Kwon, Shan Luo*

NAMRC44-19	Jinyang Xu, Mohamed El Mansori	Experimental Studies on the Cutting Characteristics of Hybrid CFRP/Ti Composite
NAMRC44-23	Farbod Akhavan Niaki, Martin Michel, Laine Mears	Extended Kalman Filter for Stochastic Tool Wear Assessment in Turning of INC718 Hard-to-Machine Alloy
NAMRC44-49	Masaki Serizawa, Takashi Matsumura	Control of Helical Blade Machining in Whirling

3:45pm – 5:15pm MSEC-NAMRC NNMI Panel: Workforce Development

Smithfield
Moderator: Hitomi Yamaguchi
Panelists:
Haley Stevens
Leanne Gluck
Rahul Chaudhari Bruce Sobczak
Terri Sandu
Marina Bograd

3:45pm - 5:15pm MSEC 2-1: Energy Field Manufacturing Process I

Ellet Valley *Session Chairs: Weilong Cong, Alessandro Fortunato*

MSEC2016-8515	Jun Ke Jiao, Qiang Wang, Feiya Wang, Wenwu Zhang	A Study on Copper Surface Pre-Treatment and Welding With Lasers
MSEC2016-8869	Erica Liverani, Andrea Gamberoni, Eleonora Balducci, Alessandro Ascari, Lorella Ceschini	Selective Laser Melting of AISI316L: Process Optimization and Mechanical Property Evaluation
MSEC2016-8718	Jibin Jiang, Guofu Lian, Mingsan Xu, Chunyu Li, Bingsan Chen, Bingbing Li	Influence of Preheating Temperature on Mechanical Properties of Laser Cladding Layer

Tuesday, June 28, 2016

3:45pm - 5:15pm MSEC 2-2: Assisted / Augmented Manufacturing Processes III

Duck Pond *Session Chairs: Ihab Ragai, Lujia Feng*

MSEC2016-8652	Hossein Mohammadi, John A. Patten	Anisotropy Effect On Cutting Monocrystal Sapphire By Micro-Laser Assisted Machining Technique
MSEC2016-8734	Naveenkumar Shanmugam, Xiaoming Yu, Hazem Alkotami, Garrick Devin, Shuting Lei	Machining of Transparent Brittle Material Assisted by Laser-Induced Seed Cracks
MSEC2016-8810	Jacklyn Niebauer, Tyler Grimm, Derek Shaffer, Ian Sweeney, Ihab Ragai, John Roth	Effect of Applied Electricity On Springback During Bending and Flattening of 304/316 Stainless Steel, Titanium ams-T-9046 And Magnesium Az31b

3:45pm - 5:15pm MSEC 2-5: Machine Design

Draper's Meadow *Session Chairs: Barbara Linke, Kai Cheng*

MSEC2016-8527	Qi Cui, Kai Cheng, Hui Ding, Shijin Chen	Design of the Virtual Machine System for High Precision Centerless Grinding and Its Implementation Perspectives
MSEC2016-8634	Eckart Uhlmann, Sascha Zimmermann	Flexible, robot guided single-pass honing
MSEC2016-8709	Xueping Zhang, Xiaoqin Wang, Daming Wang, Xiaojuan Wang, Zhenqiang Yao, Lifeng Xi	Methodology to Improve the Cylindricity of Engine Cylinder Bore by Honing

3:45pm - 5:15pm MSEC 4-4: Advances in Data Infrastructures for Manufacturing Operations Planning and Control

Drillfield *Session Chairs: Parikshit Mehta, Moneer Helu*

MSEC2016-8751	Zhengkai Wu, Thomas M. Tucker, Chandra Nath, Thomas Kurfess, Richard W. Vuduc	Step Ring Based 3D Path Planning Via GPU Simulation for Subtractive 3D Printing
MSEC2016-8635	Guodong Shao, Peter Denno, Albert Jones, Yan lu	Implementing the ISO15746 Standard for Chemical Process Optimization

Tuesday, June 28, 2016

3:45pm - 5:15pm MSEC 5-1: Manufacturing Information Management

Huckelberry

Session Chairs: Nathan Hartman, Thomas Hedberg, Jr.

MSEC2016-8745

Daniel Green

Manufacturing Information Management: Digital Stewardship in the age Cyber-Physical Production Systems

MSEC2016-8677

Qi Zhang, Lin Heng, Jiping Zhou, Zhichao Li,

Effects of Die Size on Pellet Quality for Cellulosic Ethanol Manufacturing

3:45pm - 5:15pm MSEC 8-3: Mfg. Education & Workforce Development 3

Smithfield

Session Chair: Hitomi Yamaguchi

MSEC2016-8913

Hitomi Yamaguchi

NNMI Workforce Development



Wednesday, June 29, 2016

9:15AM - 10:45AM	Room	Page
NAMRC: Dornfeld Symposium	Solitude	
NAMRC: Komanduri Symposium	Smithfield	
NAMRC: Process, Property, Performance Relationship in Additive Manufacturing- Session II	Almuni Assembly	
NAMRC Cutting III - Milling	Cascades A	
NAMRC: Machine Tool I	Cascades B	
MSEC 1-1: Effect of Surface Modification on Corrosion Behavior	Draper's Meadow	
MSEC 2-1: Energy Field Manufacturing Process II	Huckleberry	
MSEC 2-5: Tool Design and Products	Ellet Valley	
MSEC 3-1: Analysis, Design, and Manufacturing of Biomedical Devices - 1	Duck Pond	
MSEC 4-6: Cloud Manufacturing - an Industrial Perspective 3	Drillfield	
MSEC 8-2: Process, Property, Performance Relationship in Additive Mfg. 2	Almuni Assembly	

11:00AM - 12:30PM	Room	Page
NAMRC: Dornfeld Symposium	Solitude	
NAMRC: Komanduri Symposium	Smithfield	
NAMRC: Novel Topics in Additive Manufacturing- Session II	Almuni Assembly	
NAMRC Cutting VI - Milling	Cascades A	
NAMRC: Machine Tool II	Cascades B	
MSEC 1-1: Nanocrystalline Surface Modification	Draper's Meadow	
MSEC 2-1: Energy Field Manufacturing Process III	Huckleberry	
MSEC 2-5: Brittle Materials	Ellet Valley	
MSEC 3-2: Advances in Additive Biomanufacturing of Tissues and Multiscale Engineered Tissue Construct	Duck Pond	
MSEC 4-6: Cloud Manufacturing - an Industrial Perspective 4	Drillfield	
MSEC 8-2: Novel Topics in Additive Mfg. 2	Almuni Assembly	



Wednesday, June 29, 2016

2:15PM - 3:30PM

	Room	Page
NAMRC: CPS in Manufacturing	Drillfield	
NAMRC: Komanduri Symposium	Smithfield	
NAMRC: Novel Topics in Additive Manufacturing - Session III	Almuni Assembly	
NAMRC: Laser Processing I	Cascades A	
NAMRC: EDM/ECM I	Cascades B	
MSEC 1-1: Severe Shear and Plastic Deformation	Draper's Meadow	
MSEC 2-1: Energy Field Manufacturing Process IV	Huckleberry	
MSEC 2-7: Scalable Nanomanufacturing 1	Ellet Valley	
MSEC 3-1: Analysis, Design, and Manufacturing of Biomedical Devices - 2	Duck Pond	
MSEC 8-1: Dornfeld - Session 3	Solitude	

3:45PM - 5:15PM

	Room	Page
NAMRC: Dornfeld Symposium	Solitude	
NAMRC: CPS in Manufacturing	Drillfield	
NAMRC: CAD/CAM Topics in Additive Manufacturing- Session I	Almuni Assembly	
NAMRC: Laser Processing II	Cascades A	
NAMRC: EDM/ECM II	Cascades B	
MSEC 1-1: Micromechanics and Microstructure Evolution	Draper's Meadow	
MSEC 2-1: Energy Field Manufacturing Process V	Huckleberry	
MSEC 2-3: Solid-State Joining 1	Smithfield	
MSEC 2-7: Scalable Nanomanufacturing 2	Ellet Valley	
MSEC 3-1: Analysis, Design, and Manufacturing of Biomedical Devices - 3	Duck Pond	
MSEC 8-2: CAD/CAM Topics in Additive Mfg. 1	Almuni Assembly	



Wednesday, June 29, 2016

5:30PM - 7:00PM

	Room	Page
NAMRC: Dornfeld Symposium	Solitude	
MSEC 2-7: Scalable Nanomanufacturing 3	Ellet Valley	
MSEC 2-10: Processing and Testing of Polymers and Composites I	Drillfield	
MSEC 2-11: 3D Printed Smart Polymers	Cascades A	
MSEC 3-2: Advances in Additive Biomanufacturing of Tissues and Multiscale Engineered Tissue Constructs 2	Duck Pond	
MSEC 4-1: Manufacturing Equipment and Process Control	Huckleberry	
MSEC 4-9: Analytics for System Informatics and Sustainability 1	Draper's Meadow	
MSEC 4-10: Quality Assurance in Additive Manufacturing Systems	Cascades B	

7:00PM - 9:00PM

	Room
NAMRC44/MSEC 2016: Poster Session	Goodwin Hall



Wednesday, June 29, 2016

9:15am – 10:45am NAMRC: Dornfeld Symposium

Solitude

Session Chair: Moneer Helu

NAMRC44-88	Amin Mirkouei, Raunak Bhinge, Chris McCoy, Karl R. Haapala, David A. Dornfeld	A Pedagogical Module Framework to Improve Scaffolded Active Learning in Manufacturing Engineering Education
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9:15am – 10:45am NAMRC: Komanduri Symposium

Smithfield

Session Chairs: Terri Jia, Wilfredo Moscoso-Kingsley

NAMRC44-76	N Ramesh Babu, R Vairamuthu, Brij M Bhushan, R Srikanth	Performance Enhancement of Cylindrical Grinding Process with a Portable Diagnostic System
NAMRC44-123	Hossein Mohammadi, John A. Patten	Laser Augmented Diamond Drilling: A New Technique to Drill Hard and Brittle Materials
NAMRC44-15	Omar Bafakeeh, Ahmed B Khoshaim, Loan D Marinescu	ELID Fine Grinding of Sapphire Rollers with Emphasis on Roughness and Material Removal Rate

9:15am – 10:45am NAMRC: Process, Property, Performance Relationship in Additive Manufacturing- Session II

Alumni Assembly Hall

Session Chairs: Rayne Zheng, Sam Anand

NAMRC44-10	Hadi Miyanaji, Shanshan Zhang, Ausin Lassel, Amir Ali Zandinejad, Li Yang	Optimal process parameters for 3D printing of porcelain structures
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9:15am – 10:45am NAMRC Cutting III - Milling

Cascades A

Session Chairs: Patrick Kwon, Shan Luo

NAMRC44-65	Tefaye M Moges, Kaushal A Desai, P V M Rao	Improved Process Geometry Model with Cutter Runout and Elastic Recovery in Micro-End Milling
NAMRC44-73	Vignaeshwara Pandiyan, Sylvie Castagne, Sathyan Subbiah	High Frequency and Amplitude Effects in Vibratory Media Finishing
NAMRC44-39	Andrew Honeycutt, Tony Schmitz	Experimental Validation of Period-n Bifurcations in Milling

Wednesday, June 29, 2016

9:15am – 10:45am NAMRC: Machine Tool I

Cascades B

Session Chairs: Prahalad Rao, Seungchul Lee

NAMRC44-21	Edward Demeter, Kristopher Doll, Karan Arora	Influence of Curing Regimen on the Distortion of a Work-piece held by a Hybrid PAAW Fixture
NAMRC44-81	Jorge Correa, Joseph Toombs, Nicholas Toombs, Placid Ferreira	Laminated Micro-Machine: Design and Fabrication of a Flexure-based Delta Robot
NAMRC44-105	Jorge Correa, Joseph Toombs, Nicholas Toombs, Placid Ferreira	Machining and Metrology of a Chalcogenide Glass Freeform Lens Pair

9:15am - 10:45am MSEC 1-1: Effect of Surface Modification on Corrosion Behavior

Draper's Meadow

Session Chairs: Dong Lin, Wilfredo Moscoso

MSEC2016-8705	Zhencheng Ren, Xiaoning Hou, Yalin Dong, Chang Ye	Effect of Nanocrystallization-Assisted Nitriding on the Corrosion Behavior of AISI 4140 Steel
MSEC2016-8689	Ruixia Zhang, Xiaoning Hou, Xianfeng Zhou, Hongyu Gao, Steven Mankoci, Haifeng Qin, Zhencheng Ren, Gary L. Doll, Ashlie Martini, Yalin Dong, Nita Sahai, Chang Ye	Effects of Laser Shock Peening on the Wear and Degradation Behaviors of Magnesium Alloys
MSEC2016-8822	Hamdy Ibrahim, Andrew Klarner, Behrang Poorganji, David Dean, Alan Luo, Mohammad Elahinia	The Effect of Heat-Treatment on Mechanical, Microstructural, and Corrosion Characteristics of a Magnesium Alloy With Potential Application in Resorbable Bone Fixation Hardware

Wednesday, June 29, 2016

9:15am - 10:45am MSEC 2-1: Energy Field Manufacturing Process II

Huckleberry

Session Chairs: Xin Zhao, Murali Sundaram

MSEC2016-8544	Zhengyu Zhang, Yongxiang Hu, Zhenqiang Yao	An Experiment-Based Model to Determine Eigenstrain in Fibre Metal Laminates Induced by Laser Peen Forming
MSEC2016-8549	Hao Wang, Yihui Huang, Zhenying Du, Wenwu Zhang, Mengxue Bi	Effect of Laser Shock Peening on Electrochemical Corrosion Resistance of 2024 Aluminum Alloy
MSEC2016-8686	Xiaoming Yu, Carlos Trallero-Herrero, David Grojo, Shuting Lei	Three-Dimensional Modification in Silicon With Infrared Nanosecond Laser

9:15am - 10:45am MSEC 2-5: Tool Design and Products

Ellet Valley

Session Chair: Kai Cheng

MSEC2016-8636	Peter A. Arrabiyeh, Benjamin Kirsch, Jan C. Aurich	Development of Micro Pencil Grinding Tools via an Electroless Plating Process
MSEC2016-8613	Ling Yin, Abdur-Rasheed Alao, Xiao-Fei Song, Richard Stoll	Manufacturing Reliable Ceramic Crowns: The Role of Abrasive Machining in Digital Dentistry
MSEC2016-8707	Tan Jin, Jun Yi, Rui Cai	Investigation on the Grinding Force, Power and Heat Flux Distributions along the tooth profile in Form Grinding of Gears

9:15am - 10:45am MSEC 3-1: Analysis, Design, and Manufacturing of Biomedical Devices - 1

Duck Pond

Session Chairs: Bruce Tai, Hitomi Yamaguchi

MSEC2016-8690	Andrew Barnett, Lei Tan, Jessica Barrett, Jason Moore	Needle Cutting of Skin Simulants
MSEC2016-8696	Weisi Li, Wei-Chen Lin, Valens Nteziyaremye, Hitomi Yamaguchi, Dongming Guo, Albert Shih	The Effect of Magnetic Abrasive Finishing on the Needle Inner Friction Force and Biopsy Length
MSEC2016-8743	Yuan-Shin Lee, Yi Cai, Jason Moore	Intricate Geometric Design and Manufacturing on Vibration-Assisted Needles for Medical Applications

Wednesday, June 29, 2016

9:15am - 10:45am MSEC 4-6: Cloud Manufacturing - an Industrial Perspective 3

Drillfield

Session Chairs: Xi Vincent Wang, Tao Peng

MSEC2016-8723	Robert Hedrick, Ruth Jill Urbanic, Ashley Novak	A System Design for Computer-Aided Manufacturing Shared, Interactive Process Setup Sheets
MSEC2016-8752	Tiegang Zang, Yongkui Liu, Xun Xu	Cloud Manufacturing: An Industry Survey
MSEC2016-8771	Goran Adamson, Magnus Holm, Lihui Wang, Philip Moore	Feature-based Adaptive Manufacturing Equipment Control for Cloud Environments

9:15am - 10:45am MSEC 8-2: Process, Property, Performance Relationship in Additive Mfg. 2

Alumni Assembly Hall

Session Chair: Sam Anand

MSEC2016-8790	Meng (Peter) Zhang, Xiaoxu Song, Weston Grove, Emmett Hull, Zhijian Pei, Fuda Ning, Weilong Cong	Carbon Nanotube Reinforced Fused Deposition Modeling Using Microwave Irradiation
MSEC2016-8846	Feng Zhang, Feng Yang, Dong Lin, Chi Zhou	Parameter Study on 3D-Printing Graphene Oxidize Based on Directional Freezing

Wednesday, June 29, 2016

11:00am – 12:30pm NAMRC: Dornfeld Symposium

Solitude

Session Chair: Gerry Byrne

NAMRC44-50	Joyson Menezes, Mark Rubeo, Kadir Kiran, Andrew Honeycutt, Tony Schmitz	Productivity Progression with Tool Wear in Titanium Milling
NAMRC44-70	Guicai Zhang, Changsheng Guo	Modeling Flank Wear Progression Based on Cutting Force Prediction
NAMRC44-7	Raphael Corne, Chandra Nath, Mohamed El Mansori, Thomas Kurfess	Enhancing Spindle Power Data Application with Neural Network for Real-Time Tool Wear/Breakage Prediction during Inconel Drilling

11:00am – 12:30pm NAMRC: Komanduri Symposium

Smithfield

Session Chairs: Jingyan Dong, Shiva Raman

NAMRC44-56	Jia Deng, Jingyan Dong, Paul Cohen	High Rate 3D Nanofabrication by AFM-Based Ultrasonic Vibration Assisted Nanomachining
NAMRC44-120	Xiangcheng Kong, Paul Cohen, Jingyan Dong	Predictive Modeling of Feature Dimension for Tip-based Nano Machining Process
NAMRC44-153	Arkadeep Kumar, R.G.R. Prasath, Vanessa Pogue, Kevin Skenes, Chris Yang, Shreyes Melkote, Steven Danyluk	Effect of Growth Rate and Wafering on Residual Stress of Diamond Wire Sawn Silicon Wafers

11:00am – 12:30pm NAMRC: Novel Topics in Additive Manufacturing- Session II

Alumni Assembly Hall

Session Chairs: Bruce Tai and Kira Barton

NAMRC44-14	Yiwei Han, Jingyan Dong	Design of Integrated Ring Extractor for High Resolution Electrohydrodynamic (EHD) 3D Printing
NAMRC44-125	Huachao Mao, Chi Zhou, Yong Chen	LISA: Linear Immersed Sweeping Accumulation

Wednesday, June 29, 2016

11:00am – 12:30pm **NAMRC: NAMRC Cutting IV - Milling**

Cascades A

Session Chairs: Wilfredo Moscoso-Kingsley, Tony Schmitz

NAMRC44-44	Raja Kountanya, Changsheng Guo	Uncut Chip Thickness through Local Oblique Cutting Geometry
NAMRC44-61	Truong Do, Changseop Shin, Junghoon Yeom, Patrick Kwon	Fabrication of Powder-based Ceramic Micro-burners

11:00am - 12:30pm **NAMRC Machine Tool II**

Cascades B

Session Chairs: Prahalad Rao, Seungchul Lee

NAMRC44-60	Jie Gu, John Agapiou, Sheri Kurgin	Global Offset Compensation for CNC Machine Tools Based on Workpiece Errors
NAMRC44-83	N Ramesh Babu, J John Rozario Jegaraj	Condition Monitoring of Orifice in Abrasive Waterjet Cutting System Using High Pressure Sensor
NAMRC44-92	Gregory Vogl, Matthew Calamari, Sean Ye, Alkan Donmez, Brian Weiss	A Sensor-Based Method for Diagnostics of Geometric Performance of Machine Tool Linear Axes

11:00am - 12:30pm **MSEC 1-1: Nanocrystalline Surface Modification**

Draper's Meadow

Session Chairs: Christopher Saldana, Wilfredo Moscoso

MSEC2016-8701	Jingyi Zhao, Zhencheng Ren, Yang Liu, Xiahan Sang, Xiaoning Hou, Guo Xiang Wang, Yalin Dong, Chang Ye	Ultrasonic Nanocrystal Surface Modification Assisted Nitriding: An Experimental Study
MSEC2016-8703	Chi Ma, Yalin Dong, Chang Ye, The University of Akron, Akron, OH	Improving the Fracture Strength and Strain of Bulk Metallic Glasses by Ultrasonic Nano-crystal Surface Modification
MSEC2016-8737	Xiaoning Hou, Ruixia Zhang, Zhencheng Ren, Yalin Dong, Chang Ye, Xianfeng Zhou, Steven Mankoci, Nita Sahai, Haifeng Qin, Gary L. Doll	Mechanical Properties of Magnesium AZ31B Alloy After Ultrasonic Nanocrystal Surface Modification

Wednesday, June 29, 2016

11:00am - 12:30pm MSEC 2-1: Energy Field Manufacturing Process III

Huckelberry

Session Chairs: Wenda Tan, Alessandro Ascari

MSEC2016-8740	Yuan-Shin Lee, Hantang Qin, Jingyan Dong, Yi Cai,	Direct Printing of Capacitive Touch Sensors on Flexible Substrates by Additive E-Jet Printing With Silver Nanoinks
MSEC2016-8812	Yingbin Hu, Hui Wang, Fuda Ning, Weilong Cong	Laser Engineered Net Shaping of Commercially Pure Titanium: Effects of Fabricating Variables
MSEC2016-8814	Yuzhou Li, Weilong Cong, Rongxia Huang, Fuda Ning	Laser Cladding of Alumina Material Coating: Effects on Deposition Quality

11:00am - 12:30pm MSEC 2-5: Brittle Materials

Ellet Valley

Session Chairs: Mark Jackson, Robin Bright

MSEC2016-8622	Zi Jie Choong, Dehong Huo, Patrick Degenaar, Anthony O'Neill	Micro-machinability Studies of Single Crystal Silicon using Diamond End-Mill
MSEC2016-8765	Ping Li, Tan Jin, Zongfu Guo, Jun Yi, Meina Qu	Analysis on the Effects of Grinding Wheel Speed on Removal Behavior of Brittle Optical Materials
MSEC2016-8543	Guangxian Li, Mohammad Zulafif Rahim, Songlin Ding, Shoujin Sun	Wear Mechanisms of PCD Tools of Different Grain Sizes Manufactured by Conventional Abrasive Grinding and Electrical Dis-charge Grinding

11:00am - 12:30pm MSEC 3-2: Advances in Additive Biomanufacturing of Tissues and Multiscale Engineered Tissue Constructs-1

Duck Pond

Session Chairs: Binil Starly, Jason Moore

MSEC2016-8556	Bahram Raad, Narges Shayesteh Moghaddam, Mohammad Elahinia,	A Comparison Between Porous NiTi and Ti-6Al-4V Fixation Hardware on Bone Remodeling After a Reconstruction Surgery
MSEC2016-8774	Filippos Turlomousis, Houzhu Ding, Antonio Dole, Robert Chang	Towards Resolution Enhancement and Process Repeatability With a Melt Electrospinning Writing Process: Design and Proto-col Considerations
MSEC2016-8787	Arun Kumar, Binil Starly	Modeling Human Mesenchymal Stem Cell Expansion in Vertical Wheel Bioreactors Using Lactate Production Rate in Regener-ative Medicine Biomanufacturing

Wednesday, June 29, 2016

11:00am - 12:30pm MSEC 4-6: Cloud Manufacturing - an Industrial Perspective 4

Drillfield

Session Chairs: Lihui Wang, Xun Xu

MSEC2016-8620	Wenyan Zhao, Xi Vincent Wang, Jianxin Yang, Lihui Wang	A Cloud-Based Approach to Support the Mobile Phone Recycling Industry in China
MSEC2016-8733	Jiayi Liu, Jiaqiang Zhang, Zude Zhou, Duc Truong Pham	Industrial Cloud Robotics Towards Sustainable Manufacturing
MSEC2016-8669	Lei Ren, Shicheng Wang, Yijun Shen, Shikai Hong, Yudi Chen, Lin Zhang	3D Printing in Cloud Manufacturing: Model and Platform Design

11:00am - 12:30pm MSEC 8-2: Novel Topics in Additive Mfg. 2

Alumni Assembly Hall

Session Chair: Kira Barton

MSEC2016-8569	Nilabh Roy, Anil Yuksel, Michael Cullinan	Design and Modeling of a Microscale Selective Laser Sintering System
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Wednesday, June 29, 2016

2:00pm – 3:30pm NAMRC: CPS in Manufacturing

Drillfield *Session Chairs: Yuan-Shin Lee and David Culler*

NAMRC44-30	Zach Desmit, Ahmad Elhabashy, Lee Wells, Jaime Camelio	Cyber-Physical Vulnerability Assessment in Manufacturing Systems
NAMRC44-51	Lihui Wang, Azadeh Haghighi	Combined Strength of Holons, Agents and Function Blocks in Cyber-Physical Systems
NAMRC44-99	David Culler, James Long	A Prototype Smart Materials Warehouse. Application Implemented using Custom Mobile Robots and Open Source Vision Technology Developed using EmguCV

2:00pm – 3:30pm NAMRC: Komanduri Symposium

Smithfield *Session Chairs: B. Zhang, N. Umehara*

NAMRC44-38	Tizian Bucher, Christopher Bolger, Min Zhang, Chang Jun Chen, Y. Lawrence Yao.	Effect of Geometrical Modeling on Prediction of Laser-Induced Heat Transfer in Metal Foam
NAMRC44-18	Santanu Paul, Ramesh Singh, Wenyi Yan	Thermal model for additive restoration of mold steels using crucible steel
NAMRC44-12	Takafumi Hattori, Noritsugu Umehara, Hiroyuki Kousaka, Xinrui Deng, Kazuyoshi Manabe, Keiji Hayashi	Tribological properties of high hardness ta-CN _x coatings deposited by filtered arc deposition with block-on-ring tribotester

2:00pm – 3:30pm NAMRC: Novel Topics in Additive Manufacturing - Session III

Assembly Hall *Session Chairs: Bruce Tai and David Hoelzle*

NAMRC44-72	Massimiliano Annoni, Hermes Giberti, Matteo Strano	Feasibility study of an extrusion-based direct metal additive manufacturing technique.
NAMRC44-80	Anne Brant, Murali Sundaram.	A Novel Electrochemical Micro Additive Manufacturing Method of Overhanging Metal Parts Without Reliance on Support Structures.
NAMRC44-98	Dong Sung Kim, Bruce L. Tai	Support-Free Fabrication of Three-Dimensional Soft Structures

Wednesday, June 29, 2016

2:00pm – 3:30pm		
NAMRC: Laser Processing I		
Cascades A	Session Chairs: Benxin Wu, Jia Tao	
NAMRC44-20	Sagar Telrandhe, Ashish K Saxena, Pavan Sutar, Sushil Mishra	Influence of laser heat treatment on machinability of Ti6Al4V alloy
NAMRC44-89	Shuting Lei, David Grojo, Jianfeng Ma, Xiaoming Yu, Han Wu	Femtosecond laser backside ablation of gold film on silicon substrate
NAMRC44-108	Srinagalakshmi Nammi, Nilesh J Vasa, Balaganesan G, Anil C Mathur	Pulsed laser assisted micro-scribing of metal thin films in air and under water using UV, visible and near-IR wavelengths
2:00pm – 3:30pm		
NAMRC EDM/ECM I		
Cascades B	Session Chairs: Wansheng Zhao, Blake Johnson	
NAMRC44-4	Shantanu Shahane, Sanjay Pande	Development of a Thermo-Physical Model for Multi-spark Wire EDM Process
NAMRC44-66	J.F. Liu, Y.B. Guo	Thermal Modeling of EDM with Progression of Massive Random Electrical Discharges
2:00pm - 3:30pm		
MSEC 1-1: Severe Shear and Plastic Deformation		
Draper's Meadow	Session Chairs: Wilfredo Moscoso, Yang Guo	
MSEC2016-8503	Bin Zheng, Haidong Yu, Xun Wang, Xinmin Lai	Effect of Surface Roughness and Residual Stress Induced by High Speed Milling Process on Short Crack Growth
MSEC2016-8802	Saurabh Basu, Zhiyu Wang, Christopher Saldana	Modeling Evolution Of Microstructures Beneath Topographically Textured Surfaces Produced Using Shear Based Material Removal
MSEC2016-8609	Marzyeh Moradi, M. Ravi Shankar	Microstructure Engineering of Commercially Pure Ni Sheets to Enhance micro-deep drawing formability
2:00pm - 3:30pm		
MSEC 2-1: Energy Field Manufacturing Process IV		
Huckleberry	Session Chairs: Yongxiang Hu, Ninggang Shen	
MSEC2016-8562	Zengrong Hu, Guoquan Tong, Rong Xu, Lirun Zhao, Changjun Chen, Min Zhang, Yilin Sun, Huafeng Guo, Jiale Xu	Laser Sintered Graphene Reinforced Titanium Matrix Nanocomposites
MSEC2016-8859	Leonardo Orazi, Iaroslav Gnilitzkiy, Ana Paula Serro	Laser nanopatterning for wettability applications

Wednesday, June 29, 2016

2:00pm - 3:30pm MSEC 2-7: Scalable Nanomanufacturing 1

Ellet Valley *Session Chair: Robert Keynton*

MSEC2016-8584	Rapeepan Promyoo, Hazim El-Mounayri, Varun K Karingula, Kody Varahramyan	Tip-Based Nanomanufacturing (TBN) of Nanofluidics Using AFM
MSEC2016-8782	Jingzhou Zhao, Abdolreza Javadi, Ting-Chiang Lin, Injoo Hwang, Yingchao Yang, Zeyi Guan, Xiaochun Li	Scalable Manufacturing of Metal Nanoparticles by Thermal Fiber Drawing
MSEC2016-8797	Hanwen Yuan, Scott Cambron, Mark Crain, Robert Keynton	Fabrication of a Micro/Nanofluidic Platform via 3-Axis Robotic Dispensing System

2:00pm - 3:30pm MSEC 3-1: Analysis, Design, and Manufacturing of Biomedical Devices 2

Duck Pond *Session Chairs: Jyhwen Wang, Jason Moore*

MSEC2016-8513	Dakai Bian, Jason C. Tsui, Mikhail Repin, Guy Garty, Helen Turner, Y Lawrence Yao, David J. Brenner	Platform-dependent Liquid Handling in High-throughput Biodosimetry Tool
MSEC2016-8731	Xiaoran Li, Roland Chen, Russell Borduin, Wei Li	An Experimental Study On The Effect Of Compression Force Uniformity In Electrosurgical Tissue Welding
MSEC2016-8801	Mahsa Tajdari, Bruce Tai,	Modeling of Brittle and Ductile Material Drilling Using Smoothed-Particle Hydrodynamics

2:00pm - 3:30pm MSEC 8-1: Dornfeld - Session 3

Solitude *Session Chair: Elijah Kannatey-Asibu*

MSEC2016-8820	Yuki Yamada, Takamichi Ito, Jun Fujita, Hirohiko Matsuzaki	Sensorless Monitoring of Cutting Force Variation With Fractured Tool Under Heavy Cutting Condition
MSEC2016-8551	Haixi Wu, Zhonghua Yu, Yan Wang	A New Approach for Online Monitoring of Additive Manufacturing Based on Acoustic Emission
MSEC2016-8725	Maxwell K. Micali, Hayley M. Cashdollar, Zachary T. Gima, Mitchell T. Westwood	One Touch Workpiece Verification System for CNC Machining Using a Low-Cost Computer Vision Approach



Wednesday, June 29, 2016

3:45pm – 5:15pm NAMRC: Dornfeld Symposium

Solitude

Session Chair: Valerie Maier-Sperdelozzi

NAMRC44-84	Gregory Bales, Jayanti Das, Barbara Linke, Zhaodan Kong	Recognizing Gaze-Motor. Behavioral Patterns in Manual Grinding Tasks
NAMRC44-106	Marcus Jackson, Arik Van Asten, Justin Morrow, Sangkee Min, Frank Pfefferkorn	A Comparison of Energy Consumption in Wire-Based and Powder-Based Additive-Subtractive Manufacturing
NAMRC44-36	Nils Nörmann, Valerie Maier-Sperdelozzi	Cost and Environmental Impacts in Manufacturing: A Case Study Approach

3:45pm – 5:15pm NAMRC: CPS in Manufacturing

Drillfield

Session Chairs: David Culler, Binil Starly

NAMRC44-109	Haedong Jeong, Seungtae Park, Sunhee Woo, Seungchul Lee	Rotating Machinery Diagnostics using Deep Learning on Orbit Plot Images
NAMRC44-86	Kiran Deshmukh, Jeremy Rickli, Ana Djuric	Kinematic Modeling of an Automated Laser Line Point Cloud Scanning System
NAMRC44-135	Wei Chen, Emrullah Korkmaz, Arda Gozen, Burak Ozdoganlar	Accurate Measurement of High-Bandwidth Nanomilling Forces

3:45pm – 5:15pm NAMRC: CAD/CAM Topics in Additive Manufacturing-Session I

Alumni Assembly Hall

Session Chairs: Bashir Khoda, Weilong Cong

NAMRC44-100	A. Nazmul Ahsan, Ahasan Habib, Bashir Khoda	Geometric analysis for concurrent process optimization of AM
NAMRC44-27	Suchana Akter Jahan, Hazim EI-Mounayri	Optimal Conformal Cooling Channels in 3D Printed Dies for Plastic Injection Molding



Wednesday, June 29, 2016

3:45pm – 5:15pm NAMRC: Laser Processing II

Cascades A *Session Chairs: Jienfang Ma, Benxin Wu*

NAMRC44-114	Navid Dabir-Moghaddam, Sha Tao, Benxin Wu, Yung Shin	Amplification of Plasma at Different Initial Temperatures inside a Microhole by a Short Laser Pulse and the Effect on the Hole Sidewall
NAMRC44-116	Esther Blesso Vidhya Y, Nilesh Vasa	Enhancement in photoconductivity of a-Si thin films by annealing and texturing technique with the third harmonic output from a pulsed Nd ³⁺ :YAG Laser
NAMRC44-124	Jingnan Zhao, Pranav Shrotriya	Ultrahard polycrystalline cubic/wurtzite boron nitride composite through Hybrid Laser/Waterjet Heat (LWH) treatment

3:45pm – 5:15pm NAMRC: EDM/ECM II

Cascades B *Session Chairs: Lin Gu, Jingfu Liu*

NAMRC44-102	Wayne Hung, Sheril Loke, Zhujian Feng, Jigar Patel	Prediction of Material Removal Rate in Die-Sinking Electrical Discharge Machining
NAMRC44-131	Zhujian Feng, Everardo Granda, Wayne Hung	Experimental Investigation of Vibration-Assisted Pulsed Electrochemical Machining
NAMRC44-148	Yingmou Zhu, Tongsheng Liang, Lin Gu, Wansheng Zhao	Machining of micro rotational parts with wire EDM machine

Wednesday, June 29, 2016

3:45pm - 5:15pm MSEC 1-1: Micromechanics and Microstructure Evolution

Draper's Meadow *Session Chairs: Saurabh Basu, Yang Guo*

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|---------------|---|--|
| MSEC2016-8580 | Shaopeng Wei, Gang Wang, Zilin Huang, Peng Wen, Yiming Rong | Effect of Multi-Layer Laser Heating on the Microstructure and Microhardness of Laser Hot-Wire Deposited FV520B Steel |
| MSEC2016-8594 | Arman Ahmadi, Narges Shayesteh Moghaddam, Haluk E. Karaca, Reza Mirzaeifar, Mohammad Elahinia | Finite Element Modeling of Selective Laser Melting 316L Stainless Steel Parts For Evaluating the Mechanical Properties |
| MSEC2016-8778 | Ramesh Singh, V. Kartik, Kundan Kumar Singh | Segmented Cutting Coefficient Based Chatter Modeling for High-speed Micromilling of Ti6Al4V |

3:45pm - 5:15pm MSEC 2-1: Energy Field Manufacturing Process V

Huckleberry *Session Chairs: Zengrong Hu, Ross Wilcoxon*

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|---------------|----------------------------|---|
| MSEC2016-8759 | Baoyang Jiang | Micro-Machining of Glass Using Electrochemical Discharge Assisted Cutting |
| MSEC2016-8772 | Arham Ali, Murali Sundaram | Experimental Study Of Chemo-Thermal Micromachining Of Glass |
| MSEC2016-8775 | Mohamed Hashish | Near Net Shaping of Thick Materials with AWJ |

3:45pm - 5:15pm MSEC 2-3: Solid-State Joining 1

Smithfield *Session Chairs: Jingjing Li, Wayne Cai*

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|---------------|--|---|
| MSEC2016-8578 | Jamie D. Skovron, Brandt Ruzkiewicz, Laine Mears, Tim Abke | Effect of Electrical Augmentation on the Joining of Al6063-T5 Using Flow Drill Screws |
| MSEC2016-8589 | Kai Chen, Xun Liu, Jun Ni | Effects of Process Parameters on Friction Stir Spot Welding of Aluminum Alloy to Advanced High-Strength Steel |
| MSEC2016-8823 | Justin Milner, Thomas Gnaeupel-Herold, Jamie D. Skovron | Residual Stresses in Flow Drill Screwdriving of Aluminum Alloy Sheets |

Wednesday, June 29, 2016

3:45pm - 5:15pm MSEC 2-7: Scalable Nanomanufacturing 2

Ellet Valley *Session Chair: Rajiv Malhotra*

MSEC2016-8566	Tsung-Fu Yao, Andrew Duenner, Michael Cullinan	In-Line Dimensional Metrology for Nanomanufacturing Systems
MSEC2016-8793	Sourabh Saha, Chuck Divin, Jefferson Cuadra, Robert M. Panas	Part Damage Due To Proximity Effects During Sub-Micron Additive Manufacturing Via Two-Photon Lithography
MSEC2016-8693	Shalu Bansal, Chih-hung Chang, Rajiv Malhotra	The Coupling Between Densification And Optical Heating In Intense Pulsed Light Sintering Of Silver Nanoparticles

3:45pm - 5:15pm MSEC 3-1: Analysis, Design, and Manufacturing of Biomedical Devices - 3

Duck Pond *Session Chairs: Yuan-Shin Lee, Ying Zhang*

MSEC2016-8794	Avinash Danda, Yi-Tang Kao, Mathew A. Kuttolamadom, Bruce Tai	Characterization of forces in high-speed bone drilling for haptics rendering
MSEC2016-8806	Alexander Price, Luis Savastano, Wei-Chen Lin, Barry Belmont, Albert Shih	Manufacturing of Anatomically Accurate Cerebral Arteries for the Brain Aneurysm Surgical Simulator
MSEC2016-8840	Amirhesam Amerinatanzi, Narges Shayesteh Moghaddam, Ahmadreza Jahadakbar, David Dean, Mohammad Elahinia	On the Effect of Screw Preload on the Stress Distribution of Mandibles During Segmental Defect Treatment using an Additively Manufactured Hardware

3:45pm - 5:15pm MSEC 8-2: CAD/CAM Topics in Additive Mfg. 1

Alumni Assembly Hall *Session Chair: Jing Shi*

MSEC2016-8784	Sushmit Chowdhury, Sam Anand	Artificial Neural Network Based Geometric Compensation For Thermal Deformation In Additive Manufacturing Processes
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Wednesday, June 29, 2016



5:30pm - 7:00pm MSEC 2-7: Scalable Nanomanufacturing 3
Ellet Valley *Session Chair: Michael Cullinan*

MSEC2016-8662	Mark Atwater, Roger Welsh	Direct Synthesis of Nanofibrous Nonwoven Carbon Components: Initial Observations, Capabilities and Challenges
MSEC2016-8671	Yuan Wang, Mohamed Saad, Kang Ni, Yen Chi Chang, Cheng-Wei Chen, Liang Pan, Chen Chen, Tsu-Chin Tsao, Adrienne Lavine, David Bogy, Xiang Zhang	Scalable Plasmonic Nanolithography: Prototype System Design and Construction

5:30pm - 7:00pm MSEC 2-10: Processing and Testing of Polymers and Composites I
Drillfield *Session Chairs: Loredana Santo, Felicia Stan*

MSEC2016-8557	Felicia Stan, Laurentiu Ionut Sandu, Catalin Fetecau, Razvan Rosculet	Effect of Reprocessing on the Rheological, Electrical and Mechanical Properties of Polypropylene/Carbon Nanotube Composites
MSEC2016-8678	Gregory M Lambert, Donald Baird	Evaluating Rigid and Semi-Flexible Orientation Evolution Models in Simple Flows

5:30pm - 7:00pm MSEC 2-11: 3D Printed Smart Polymers
Cascades A *Session Chairs: Howon Lee, Keng Hsu*

MSEC2016-8667	Daehoon Han, Zhaocheng Lu, Howon Lee	Projection Micro-Stereolithography of Temperature Responsive and Mechanically Tough Hydrogels
MSEC2016-8826	Xuan Song, Zhuofeng Zhang, Zeyu Chen, Yong Chen	Porous Structure Fabrication Using a Stereolithography-based Sugar Foaming Method
MSEC2016-8865	Yayue Pan, Lu Lu	Additive Manufacturing of Magnetic Field-Responsive Smart Polymer Composites

Wednesday, June 29, 2016

5:30pm - 7:00pm MSEC 3-2: Advances in Additive Biomanufacturing of Tissues and Multiscale Engineered Tissue Constructs-2

Duck Pond *Session Chairs: Robert Chang, Eda Yildirim-Ayan*

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|---------------|---|--|
| MSEC2016-8582 | Mengyun Zhang, Changxue Xu | Ligament Flows of Exit-Pinching During Drop-On-Demand Inkjetting of Alginate Solution |
| MSEC2016-8588 | Houzhu Ding, Antonio Dole, Filippos Tourlomis, Robert Chang | Design of a Skin Grafting Methodology for Burn Wound Using an Additive Biomanufacturing System Guided by Hyperspectral Imaging |
| MSEC2016-8619 | Ozlem Yasar, Serkan Inceoglu | Compressive Evaluation of Polyethylene (Glycol) Diacrylate (PEGDA) for Scaffold Fabrication |

5:30pm - 7:00pm MSEC 4-1: Manufacturing Equipment and Process Control

Huckleberry *Session Chairs: Ping Guo, Hongtao Ding*

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|---------------|--|---|
| MSEC2016-8573 | Chao Wang, Kai Cheng, Richard Rakowski | Development of Smart Tooling Concepts Applied to Ultra-Precision and High Speed Machining |
| MSEC2016-8529 | Shingo Tajima, Burak Sencer | Smooth Cornering Strategy for High Speed CNC Machine Tools With Confined Contour Error |
| MSEC2016-8762 | Yuta Oba, Yasuhiro Kakinuma | Tool Posture and Polishing Force Control on Unknown 3-Dimensional Curved Surface |

5:30pm - 7:00pm MSEC 4-9: Analytics for System Informatics and Sustainability 1

Draper's Meadow *Session Chairs: Weihong Guo, Ran Jin, Chenhui Shao*

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|---------------|--|---|
| MSEC2016-8506 | Jing Zou, Qing Chang, Yong Lei, Jorge Arinez, Guoxian Xiao | Modeling and Performance Identification for General Production System Using Sensor Data |
| MSEC2016-8518 | Xinyan Ou, Maen Alkheder, Qing Chang | Experimental Analysis of Process Parameters in Composite Manufacturing |
| MSEC2016-8617 | Ye Li, Anand Sekar | A Bending-Machining Hybrid Process for Angular Dimensional Accuracy Enhancement |

Wednesday, June 29, 2016

5:30pm - 7:00pm **MSEC 4-1: Quality Assurance in Additive Manufacturing Systems**

Cascades B *Session Chairs: Prahalad Rao, Chi Zhou, Olga Wodo*

MSEC2016-8516	Prahalad Rao, Zhenyu (james) Kong, Chad Duty, Rachel Smith	Three Dimensional Point Cloud Measurement Based Dimensional Integrity Assessment for Additive Manufactured Parts Using Spectral Graph Theory
MSEC2016-8535	Roohbeh Salary, Jack Lombardi, III, M. Samie Tootooni, Ryan Donovan, Prahalad Rao, Mark Poliks	In Situ Sensor-Based Monitoring and Computational Fluid Dynamics (CFD) Modeling of Aerosol Jet Printing (AJP) Process
MSEC2016-8815	Kai Xu, Tsz-Ho Kwok, Yong Chen	A Reverse Compensation Framework for Shape Deformation in Additive Manufacturing

Thursday, June 30, 2016

9:15AM - 10:45AM	Room	Page
NAMRC: Mfg Systems	Drillfield	
NAMRC: Process, Property, Performance Relationship in Additive Mfg - Session III	Almuni Assembly	
NAMRC:Forming II	Cascades A	
NAMRC Surface II	Cascades B	
MSEC 2-6: Forming 1	Draper's Meadow	
MSEC 2-7: Scalable Nanomanufacturing 4	Duck Pond	
MSEC 2-10: Processing and Testing of Polymers and Composites	Smithfield	
MSEC 4-9: Analytics for System Informatics and Sustainability 2	Ellet Valley	
MSEC 4-11: Intelligent Maintenance Decision Making for Manufacturing Systems	Huckleberry	
MSEC 8-1: Dornfeld - Session 5 - Smart Mfg	Solitude	
MSEC 8-2: Process, Property, Performance Relationship in Additive Mfg. 3	Almuni Assembly	

11:00AM - 12:30PM	Room	Page
NAMRC: Mfg Systems	Solitude	
NAMRC: CAD/CAM Topics in Additive Manufacturing	Almuni Assembly	
NAMRC: Cutting V - Turning	Cascades B	
MSEC 2-6: Forming 2	Draper's Meadow	
MSEC 2-8: Modeling, Analysis, and Simulation of Mfg. Processes 1	Duck Pond	
MSEC 2-10: Advances in Manufacturing of Polymers and Composites	Smithfield	
MSEC 4-1: Manufacturing Equipment II	Huckleberry	
MSEC 4-9: Analytics for System Informatics and Sustainability 3	Ellet Valley	
MSEC 8-1: Dornfeld - Session 6 - Sustainable Mfg. 2	Solitude	
MSEC 8-2: Modeling and Simulation of Metal Additive Mfg	Almuni Assembly	



Thursday, June 30, 2016

2:15PM - 3:45PM

	Room	Page
NAMRC: Mfg Systems	Drillfield	
NAMRC: Abrasive Machining	Cascades A	
NAMRC: Joining II	Cascades B	
MSEC 2-6: Forming 3	Draper's Meadow	
MSEC 2-8: Modeling, Analysis, and Simulation of Mfg. Processes 2	Duck Pond	
MSEC 2-13: Machining of Ceramics and Ceramic Matrix Composites	Smithfield	
MSEC 4-2: Process-Machine-Interactions 1	Ellet Valley	
MSEC 4-9: Analytics for System Informatics and Sustainability 4	Huckleberry	
MSEC 8-1: Dornfeld - Session 7 - Sustainable Mfg. 3	Solitude	

4:00PM - 5:30PM

	Room	Page
NAMRC: Mfg Systems	Drillfield	
NAMRC: Cutting VI - Drilling	Cascades A	
MSEC 2-6: Forming 4	Cascades B	
MSEC 2-8: Modeling, Analysis, and Simulation of Mfg. Processes 3	Duck Pond	
MSEC 4-2: Process-Machine-Interactions 2	Ellet Valley	
MSEC 4-8: High Performance Computing and Data Analytics in Manufacturing	Draper's Meadow	
MSEC 8-1: Dornfeld - Session 8 - Sustainable Mfg. 4	Solitude	

Thursday, June 30, 2016

9:15am – 10:45am NAMRC: Mfg Systems

Drillfield

Session Chairs: Laine Mears, Dazhong Wu

NAMRC44-25	Honghan Ye, Wei Li, Enming Miao	An effective heuristic for no-wait flow shop production to minimize makespan
NAMRC44-22	Amin Abedini, Honghan Ye, Wei Li	Operating room planning under surgery type and priority constraints
NAMRC44-34	Mayur Wakhare, Dusan Sormaz	Sequencing of Setups in Automated Setup and Fixture Planning

9:15am – 10:45am NAMRC: Process, Property, Performance Relationship in Additive Mfg - Session III

Alumni Assembly Hall

Session Chairs: Kevin Chou, Weilong Cong

NAMRC44-117	Xiaoqing Wang, Tahmina Keya, Kevin Chou	Build height effect on the Inconel 718 parts fabricated by Selective Laser Melting
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9:15am – 10:45am NAMRC: Forming II

Cascades A

Session Chairs: Gracious Ngaile, Jyhwen Wang

NAMRC44-24	Francesco Medea, Andrea Ghiotti, Stefania Bruschi	Temperature Effects on Organic Lubricants in Cold Forging of AA1050 Alloy
NAMRC44-113	James Lowrie, Gracious Ngaile	Analytical Modeling of Hydrodynamic Lubrication in a Multiple-Reduction Drawing Die
NAMRC44-11	Beatrice Valoppi, Stefania Bruschi, Andrea Ghiotti	Modelling of Fracture Onset in Ti6Al4V Sheets Deformed at Elevated Temperature

Thursday, June 30, 2016

9:15am – 10:45am NAMRC: Surface II

Cascades B

Session Chairs: Bruce Tai, Jingyan Dong

NAMRC44-75	Tapas Bajpei, Chelladurai H, Mohd Zahid Ansari	Numerical investigation of transient temperature and residual stresses in thin dissimilar GMAW aluminium alloy plates
NAMRC44-91	Armando Msrques, Cleudes Guimarães, Rosemar Da Silva, Maria Fonseca, Wisley Sales, Alisson Machado	Surface integrity analysis of Inconel 718 after turning with different solid lubricants dispersed in neat oil delivered by MQL.
NAMRC44-93	Madhu Mutyala, Lianyi Chen, Ting Chiang Lin, Benjamin Maier, Beata Tyburska, Kumar Sridharan, Kornel Ehmann, Xiaochun Li	Surface Modification of Polycrystalline Diamond Compacts by Carbon Ion Irradiation

9:15am - 10:45am MSEC 2-6: Forming 1

Draper's Meadow

Session Chair: Rajiv Malhotra

MSEC2016-8532	Marlon Hahn, Nooman Ben Khalifa, Christian Weddeling, Ar2-6ash Shabaninejad	Springback Behavior of Carbon-Fiber-Reinforced Plastic Laminates With Metal Cover Layers in V-Die Bending
MSEC2016-8649	Chetan Nikhare	Parametric Study on Wall Springback in Tailor Welded Long Channels
MSEC2016-8811	Tyler Grimm, John Roth, Ihab Ragai	Electrically Assisted Global Springback Elimination in AMS-T-9046 Titanium After Single Point Incremental Forming

9:15am - 10:45am MSEC 2-7: Scalable Nanomanufacturing 4

Duck Pond

Session Chair: Jorge Correa

MSEC2016-8650	Jhonatam Cordeiro, Salil Desai	The Leidenfrost Effect at the Nanoscale
MSEC2016-8835	Bruno Azeredo, Placid Ferreira, Keng Hsu	Direct Electrochemical Imprinting of Sinusoidal Linear Gratings into Silicon
MSEC2016-8567	Joon Hyong Cho, Guoao Sun, Michael Cullinan	A Method to Manufacture Repeatable Graphene-based NEMS Devices at the Wafer-scale

Thursday, June 30, 2016

9:15am - 10:45am MSEC 2-10: Processing and Testing of Polymers and Composites

Smithfield

Session Chairs: Fabrizio Quadrini, Catalin Fetecau

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| MSEC2016-8571 | Catalin Fetecau, Felicia Stan, Nicoleta Violeta Cristea, Laurentiu Lonut Sandu | An Analysis of Interfacial Adhesion Between TPU/MWCNT Composites and ABS Substrate by Over Injection Molding |
| MSEC2016-8638 | Patrick McNeff Brian Paul | Predicting The Force Needed to Create A Compression Seal In An Ultra-Thin Elastoviscoplastic Membrane |

9:15am - 10:45am MSEC 4-9: Analytics for System Informatics and Sustainability 2

Ellet Valley

Session Chairs: Hui Wang, Qing Chang

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|---------------|--|---|
| MSEC2016-8685 | Liu Haijiang, Xu Kaixiang, Pan Zhenhua | Forecast Method Of Customer Needs Volatility To Personalized Product |
| MSEC2016-8704 | Zhengqian Jiang, Hui Wang | Assembly Hierarchy Generation For Assembly System Design For A Product Family |
| MSEC2016-8717 | Jie Ren, Hui Wang | Surface Variation Modeling By Fusing Surface Measurement Data with Multiple Manufacturing Process Variables |

9:15am - 10:45am MSEC 4-11: Intelligent Maintenance Decision Making for Manufacturing Systems

Huckleberry

Session Chairs: Yong Wang, Zeyi Sun

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|---------------|--|---|
| MSEC2016-8547 | Yong Wang, Adam J. Brzezinski, Xianli Qiao, Jun Ni | Heuristic Feature Selection for Shaving Tool Wear Classification |
| MSEC2016-8615 | Xufeng Yao, Zeyi Sun, Dong Wei, Lingyun Wang | Joint Maintenance and Energy Management in Manufacturing Systems: Prospect Discussion, Challenge Analysis, and a Case Study |
| MSEC2016-8674 | Masoumeh Aminzadeh, Thomas Kurfess | Vision-Based Inspection System for Dimensional Accuracy in Powder-Bed Additive Manufacturing |

Thursday, June 30, 2016

9:15am - 10:45am MSEC 8-1: Dornfeld - Session 5 - Smart Mfg

Solitude

Session Chair: Kevin Smith

MSEC2016-8564	Feng Jiao, Bo Zhao	Research on Ultrasonic Aided Fixed-Abrasive Lapping Technology for Engineering Ceramics Cylindrical Part
MSEC2016-8629	Sid Venkatesh, Sidney Ly, Martin Manning, John Michaloski, Fred Proctor	Automating Asset Knowledge with MTConnect
MSEC2016-8586	Manik Rajora, Pan Zou, Steven Y. Liang	A hybrid RF-GA approach to bottleneck machine diagnosis and suggestion in parallel machine Job-shop scheduling

9:15am - 10:45am MSEC 8-2: Process, Property, Performance Relationship in Additive Mfg. 3

Alumni Assembly Hall

Session Chair: Weilong Cong

MSEC2016-8863	Guanglei Zhao, Chi Zhou, Dong Lin	Thermal Analysis on Directional Freezing of Nano Aqueous Suspensions in Graphene Aerogel 3D Printing Process
MSEC2016-8684	Yachao Wang, Jing Shi, Shiqiang Lu, Yun Wang	Solution and Aging Treatments of Inconel 718/TiC Nanocomposite from Selective Laser Melting

Thursday, June 30, 2016

11:00am – 12:30pm NAMRC: Mfg Systems

Drillfield

Session Chairs: Lihui Wang, Valerie Maier Sperdelozzi

NAMRC44-112	Shiv Shailendar, Murali Sundaram	Modeling of Deposition Height in Localized Electrochemical Deposition Using Liquid Marbles
NAMRC44-121	Jingzhu Pang, Beizhi Li, Chongjun Wu, Yao Liu	Rayleigh heat flux distribution model in the cylindrical grinding contact area
NAMRC44-42	Mark Rubeo, Tony Schmitz	Milling Force Modeling: A Comparison of Two Approaches

11:00am – 12:30pm NAMRC: CAD/CAM Topics in Additive Manufacturing

Alumni Assembly Hall

Session Chairs: Sam Anand and Kevin Chou

NAMRC44-82	Diego Andrade, Wei He, Kenji Shimada	Automated Generation of Repeated Geometric Patterns for Customized Additively Manufactured Personal Products.
NAMRC44-87	Rohit Vaidya, Sam Anand	Image Processing Assisted Tools for Pre- and Post-Processing Operations in Additive Manufacturing
NAMRC44-90	Rohan Vaidya, Sam Anand	Optimum Support Structure Generation for Additive Manufacturing using Unit Cell Structures and Support Removal Constraint.

11:00am – 12:30pm NAMRC: Forming III

Cascades A

Session Chairs: Stefania Bruschi, Jyhwen Wang

NAMRC44-64	Melissa Slaglen Iris Rivero	Bulk Manufacture of Complex Geometry Millirod Implants and Their Degradation and Drug Delivery Characteristics
NAMRC44-111	Zixuan Zhang, Huan Zhang, Yi Shi, Newell Moser, Huaqing Ren, Kornel Ehmann, Jian Cao	Springback Reduction by Annealing for Incremental Sheet Forming
NAMRC 126	Jyhwen Wang, Mahesh Nair, Ying Zhang	An Efficient Force Prediction Strategy in Single Point Incremental Sheet Forming.



Thursday, June 30, 2016

11:00am – 12:30pm NAMRC: Cutting V - Turning

Cascades B

Session Chairs: Raja Kountanya, Xiaoliang Jin

NAMRC44-94	Sirisak Tooptong, Kyung-Hee Park, Seok-Woo Lee, Patrick Kwon	A Preliminary Machinability Study of Flake and Compacted Graphite Irons with Multilayer Coated and Uncoated Carbide Inserts
NAMRC44-141	Jean Garcia-Gonzalez, Wilfredo Moscoso-Kingsley, Viswanathan Madhavan	Rake Face Temperature when Machining with Coated Cutting Tools

11:00am - 12:30pm MSEC 2-6: Forming 2

Draper's Meadow

Session Chair: Ihab Ragai

MSEC2016-8533	Mohammad Ali Davarpanah, Shalu Bansal, Rajiv Malhotra	Mechanical Properties and Chain Orientation in Single Point Incremental Forming of Semi-Crystalline Polyamide
MSEC2016-8805	Trey Neveux, John Roth, Ihab Ragai	Springback Induced in Single Point Incrementally Formed 2024-T3 Aluminum of Various Thicknesses
MSEC2016-8813	Trey Neveux, Brandt Ruskiewicz, Tyler Grimm, John Roth, Ihab Ragai	Electrically Assisted Global Springback Elimination After Single Point Incremental Forming

Thursday, June 30, 2016

11:00am - 12:30pm MSEC 2-8: Modeling, Analysis, and Simulation of Mfg. Processes 1

Duck Pond *Session Chair: Laine Mears*

MSEC2016-8583	Zhichao (Charlie) Li, Andrew Freborg, Lynn Ferguson	Effect of Preheat on Improving Beneficial Surface Residual Stresses During Induction Hardening Process
MSEC2016-8656	Changqing Qiu, Jianfeng Ma, Shuting Lei	Assessment of the Effects of Microgrooved Cutting Tool on the Machining Induced Residual Stress in Machining of Ti-6Al-4V
MSEC2016-8739	Changqing Qiu, Shuting Lei	Changqing Qiu, Jianfeng Ma, Saint Louis University, Saint Louis, MO, United States, Shuting Lei, Kansas State Univ, Manhattan, KS,
MSEC2016-8739	Arthur Reardon, Zhichao (Charlie) Li, Andrew Freborg, Lynn Ferguson	Investigating a Die Quench Cracking Problem in 52100 Steel Bearing Rings With Computer Simulation

11:00am - 12:30pm MSEC 2-10: Advances in Manufacturing of Polymers and Composites

Smithfield *Session Chairs: Felicia Stan, Catalin Fetecau*

MSEC2016-8528	Fabrizio Quadrini, Loredana Santo, Tomislav Oskorus, Wieslaw Wasniowski, Ettore Musacchi	Production of Rubber Goods Made of 100% Ground Tire Rubber
MSEC2016-8621	Loredana Santo, Fabrizio Quadrini	Conceptual Prototypes of Composite Structures for Aerospace
MSEC2016-8786	Russell Borduin, Wei Li	Development of Foamed PES-Zeolite Mixed Matrix Membranes for PEM Fuel Cell Humidification

Thursday, June 30, 2016

11:00am - 12:30pm MSEC 4-1: Manufacturing Equipment II

Huckleberry

Session Chairs: Keith Bourne, Chao Wang

MSEC2016-8643	Keyu Chen, Ping Guo	Design of a High Bandwidth Non-Resonant Tertiary Motion Generator for Elliptical Vibration Texturing
MSEC2016-8710	Yang Yang, Ping Guo	Fast Generation of Planar Micro-Structured Surfaces by Elliptical Vibration Texturing
MSEC2016-8862	Chao Du, Dun Lu, Jun Zhang, Huijie Zhang	Pose-Dependent Dynamic Modeling and Analysis of Bi-Rotary Milling Head

11:00am - 12:30pm MSEC 4-9: Analytics for System Informatics and Sustainability 3

Ellet Valley

Session Chairs: *H. John Wang, Weihong Guo*

MSEC2016-8722	Huanyi Shui, Xiaoning Jin, Jun Ni	Roll-to-Roll Manufacturing System Modeling and Analysis By Stream of Variation Theory
MSEC2016-8735	Xi Gu, Xiaoning Jin, Weihong Guo	Estimation of Real-Time Active Maintenance Opportunity Windows in Manufacturing Systems with Bernoulli Machines
MSEC2016-8750	Xi Gu, Xiaoning Jin, Weihong Guo,	Estimation of Real-Time Active Maintenance Opportunity Windows in Manufacturing Systems with Bernoulli Machines
MSEC2016-8750	Weihong Guo, Judy Jin, S. Jack Hu	Profile Monitoring and Fault Diagnosis via Sensor Fusion for Ultrasonic Welding

Thursday, June 30, 2016

11:00am - 12:30pm MSEC 8-1: Dornfeld - Session 6 - Sustainable Mfg. 2

Solitude

Session Chair: John Sutherland

MSEC2016-8642	Eckart Uhlmann, Bernd Peukert, Simon Thom, Lukas Prasol, Paul Fürstmann, Fiona Sammler, Sebastian Richarz	Solutions for Sustainable Machining
MSEC2016-8746	Gustavo M. Minquiz, Vicente Borja, Marcelo Lopez Parra, David Dornfeld, Pablo Flores, Sandvik Coromant	A Comparative Analysis Between High Speed Dynamic and Traditional Pocketing Toolpaths in Precision Milling Machines
MSEC2016-8804	Matteo Smullin, Ian Garretson, Karl Haapala	Composability of Unit Manufacturing Process Models for Manufacturing Systems Analysis

11:00am - 12:30pm MSEC 8-2: Modeling and Simulation of Metal Additive Mfg

Alumni Assembly Hall

Session Chair: Shawn Moylan

MSEC2016-8692	Felipe Lopez, Paul Witherell, Brandon Lane	Identifying uncertainty in Laser Powder Bed Fusion models
MSEC2016-8623	Keith Bourne, David Roberson,	Simulation of Cross-Sectional Geometry During Laser Powder Deposition of Tall Thin-Walled and Thick-Walled Features
MSEC2016-8819	Bo Cheng, Subin Shrestha, Y. Kevin Chou,	Stress and Deformation Evaluations of Scanning Strategy Effect in Selective Laser Melting



Thursday, June 30, 2016

2:15pm – 3:45pm NAMRC: Mfg Systems

Drillfield

Session Chairs: Sam Anand and James Kong

NAMRC44-59	Mark Rubeo, Tony Schmitz	Global Stability Predictions for Flexible Workpiece Milling
NAMRC44-144	Payam Haghighi, Satchit Ramnath, Nathan Kalish, Jiten Shah, Jami Shah, Joseph Davidson	Method for Automating Digital Fixture-Setups that are Optimal for Machining Castings to Minimize Scrap
NAMRC44-32	Elisabeth Lervåg Synnes, Torgeir Welo	Bridging the Gap Between High and Low-Volume Production through Enhancement of Integrative Capabilities

2:15pm – 3:45pm NAMRC: Abrasive Machining

Cascades A

Session Chairs: Hongseok Choi, Mark Jackson

NAMRC44-16	Qiuyun Huang, Lei Guo, Loan Marinescu	Research on the Properties of Resin Bond Wheel Cured by Ultraviolet Light
NAMRC44-146	Yihao Zheng, Yang Liu, Yao Liu, Albert Shih	Experimental Investigation of the Grinding Force in Rotational Atherectomy

2:15pm – 3:45pm NAMRC: Joining II

Cascades B

Session Chairs: Hongtao Ding, Wayne Cai

NAMRC44-9	Ramin Hajavifard, Mehdi Motahari, Huseyin Özden, Hadi Miyanaji, Sajad Kafashi	The effects of pulse shaping variation in laser spot-welding of aluminum
NAMRC44-96	Ali Nassiri, Brad Kinsey	Numerical Studies on High-Velocity Impact Welding: Smoothed Particle Hydrodynamics (SPH) and Arbitrary Lagrangian-Eulerian (ALE)
NAMRC44-107	Amber Shrivastava, Michael Zinn, Neil Duffie, Nicola Ferrier, Christopher Smith, Frank Pfefferkorn	Force Measurement-based Discontinuity Detection during Friction Stir Welding

Thursday, June 30, 2016

2:15pm - 3:45pm MSEC 2-6: Forming 3

Draper's Meadow *Session Chair: Rajiv Malhotra*

MSEC2016-8829	Huan Zhang, Zixuan Zhang, Huaqing Ren, Newell Moser, Jian Cao	Dieless Double-sided Incremental Hole-flanging With Different Toolpath Strategies
MSEC2016-8839	Huaqing Ren, Newell Moser, Zixuan Zhang, Kornel Ehmann, Jian Cao	Effects of Tool Deflection in Accumulated Double-Sided Incremental Forming Regarding Part Geometry

2:15pm - 3:45pm MSEC 2-8: Modeling, Analysis, and Simulation of Mfg. Processes 2

Duck Pond *Session Chair: Zhichao (Charlie) Li,*

MSEC2016-8595	Asif Tanveer, Deepak Marla, Shiv G Kapoor	A Thermal Model to Predict Tool Temperature in Machining of TI-6AL-4V Alloy with an Atomization-Based Cutting Fluid Spray System
MSEC2016-8768	Ranjit singh, Rajesh Kumar, Jatinder Madan	A Systematic Approach for Computer-aided Gating-System Design for Die Casting Dies
MSEC2016-8874	Benjamin R. Mitchell, Ali Nassiri, Michael R. Locke, Joseph Klewicki, Yannis Korkolis, Brad Kinsey	Experimental and Numerical Framework for Study of Low Velocity Water Droplet Impact Dynamics

2:15pm - 3:45pm MSEC 2-13: Machining of Ceramics and Ceramic Matrix Composites

Smithfield *Session Chairs: Steven Y. Liang, Patrick Kwon*

MSEC2016-8510	Demeng Che, Weizhao Zhang, Kornel Ehmann	Rock Cutter Interactions in Linear Rock Cutting
MSEC2016-8766	Daniel Ross, Yanming Wang, Hadyan Ramadhan, Hitomi Yamaguchi	Polishing Characteristics of Transparent Polycrystalline YAG Ceramics Using Magnetic Field-Assisted Finishing

Thursday, June 30, 2016

2:15pm - 3:45pm MSEC 4-2: Process-Machine-Interactions 1

Ellet Valley *Session Chairs: Durul Ulutan, Burak Sencer*

MSEC2016-8713	Qinghua Wang, Baoqing Zhang, Ninggang Shen, Hongtao Ding	Mechanical Ruling of Diffraction Grating: Part I ? Aluminum Film Preparation and Characterization
MSEC2016-8715	Benjamin Hamilton, Sama Hussein, O. Remus Tutunea-Fatan, Evgueni Bordatchev	Fabrication of Right Triangular Prism Retroreflectors Through Ultraprecise Single Point Inverted Cutting

2:15pm - 3:45pm MSEC 4-9: Analytics for System Informatics and Sustainability 4

Huckleberry *Session Chair: Ran Jin, Hui Wang*

MSEC2016-8757	Juan Du, Xi Zhang	A Critical Change Point Detection Method In Threaded Steel Pipe Connection Processes Using Two Stage Sequential Piece-wise Linear Approach
MSEC2016-8781	Wenmeng Tian, Lee J. Wells, Jaime A. Camelio	Broaching Tool Degradation Characterization based on Functional Descriptors
MSEC2016-8854	Faping Zhang, Yan Yan, Di Wu, Jibing Yang	Independent Component Analysis based Machining Error Separation

2:15pm - 3:45pm MSEC 8-1: Dornfeld - Session 7 - Sustainable Mfg. 3

Solitude *Session Chair: Yuebin Guo*

MSEC2016-8517	Barbara Linke, Destiny Garcia, Gurpreet Kaur, Farhad Ghadamli	Sustainable Process Planning for Subtractive and Additive Manufacturing Unit Processes
MSEC2016-8719	Zhenhua Wu, Marthony Hobgood, Mathias Wolf, Sandvik Coromant	Energy Mapping and Optimization in Rough Machining of Impellers
MSEC2016-8880	Daniel Cooper, Kathleen Rossie, Timothy Gutowski	An Environmental and Cost Analysis of Stamping Sheet Metal Parts

Thursday, June 30, 2016

4:00pm – 5:30pm NAMRC: Mfg Systems

Drillfield

Session Chairs: Dusan Somaz, Wei Li

NAMRC44-37	Allen Sandwell, Chaneel Park, Simon Park	Development of Multi-Degrees of Freedom Optical Table Dynamometer
NAMRC44-110	Siim Koppel, Shing I Chang	A Process Capability Analysis Method Using Adjusted Modified Sample Entropy.

4:00pm – 5:30pm NAMRC: Cutting VI - Drilling

Cascades A

Session Chairs: Wilfredo Moscoso-Kingsley, Tony Schmitz

NAMRC44-2	Hukuzo Yagishita, Jiro Osawa	Highly Accurate Hole Making Technology of Ti6Al4V by Orbital Drilling? Effect of Oil Mist?
NAMRC44-130	Jianbo Sui, Raja Kountanya, Changsheng Guo	Development of a mechanistic force model for CNC drilling process simulation.
NAMRC44-43	Chandra Nath, Thomas Kurfess	Obstruction-Type Chip Breakers for Controllable Chips and Improved Cooling/Lubrication during Drilling – A Feasibility Study

4:00pm - 5:30pm MSEC 2-6: Forming 4

Cascades B

Session Chair: Gracious Ngaile

MSEC2016-8753	Shamik Basak, Sushanta Panda	Application Of Barlat Yld-96 Yield Criterion For Predicting Formability Of Pre-Strained Dual Phase Steel Sheets
MSEC2016-8756	Sudhy S Panicker, Sushanta Panda	Improvement In Material Flow During Non-Isothermal Warm Deep Drawing Of Non-Heat Treatable Aluminum Alloy Sheets
MSEC2016-8852	Lin Li, Gracious Ngaile, Tasnim Hassan	A Novel Hybrid Heating Method for Elevated Temperature Mechanical Testing of Miniature Specimens

Thursday, June 30, 2016

4:00pm - 5:30pm MSEC 2-8: Modeling, Analysis, and Simulation of Mfg. Processes 3
Duck Pond Session Chair: Arif Malik

MSEC2016-8708	Xueping Zhang, Rajiv Shivpuri, Anil Srivastava	Microstructure Sensitive Flow Stress Based on Self Consistent Method
MSEC2016-8724	Amaninder Gill, Darian Visotsky, Laine Mears, Joshua Summers	Cost Estimation Model for PAN Based Carbon Fiber Manufacturing Process
MSEC2016-8577	Hongyu Chen, Peter Wapperom, Donald Baird	Simulation of Long Semi-Flexible Fiber Orientation During Injection Molding

4:00pm - 5:30pm MSEC 4-2: Process-Machine-Interactions 2
Ellet Valley Session Chairs: Burak Sencer, Alex O'Connor

MSEC2016-8665	Xiaoliang Jin, Narahara Gopal Koya	Prediction of Coupled Torsional-Axial Vibrations of Drilling Tool with Clamping Boundary Conditions
MSEC2016-8872	Norikazu Suzuki, Ryosuke Ikeda, Eiji Shamoto	Primitive Study on Model-Based Process Identification by Utilizing Force Estimation Techniques

4:00pm - 5:30pm MSEC 4-8: High Performance Computing and Data Analytics in Manufacturing
Draper's Meadow Session Chairs: Dazhong Wu, Janis Terpenney

MSEC2016-8525	Mohammad M. Hossain, Chandra Nath, Thomas M. Tucker, Richard W. Vuduc, Thomas Kurfess	A Graphical Approach for Freeform Surface Offsetting with GPU Acceleration for Subtractive 3D Printing
MSEC2016-8559	Dazhong Wu, Janis Terpenney, Li Zhang, Robert Gao, Thomas Kurfess	Fog-Enabled Architecture for Data-Driven Cyber-Manufacturing Systems
MSEC2016-8625	Connor Jennings, Dazhong Wu, Janis Terpenney	Forecasting Obsolescence Risk Using Machine Learning

Thursday, June 30, 2016

**4:00pm - 5:30pm MSEC 8-1: Dornfeld - Session 8 - Sustainable Mfg. 4
Solitude Session Chair: Barbara Linke**

MSEC2016-8730	Fan Fang, Kai Cheng, Shijin Chen, Liang Zhao, Hui Ding	Sustainable Design and Analysis of CNC Machine Tools: Sustainable Design Index Based Approach and Its Application Per-spectives
MSEC2016-8639	Ardeshir Raihanian Mashhadi, Sara Behdad, Jun Zhuang	Agent Based Simulation Optimization of Waste Electrical and Electronics Equipment Recovery
MSEC2016-8682	Liang Cong, Fu Zhao, John Sutherland	A Method to Optimize Value Recovery from End-of-Life Products